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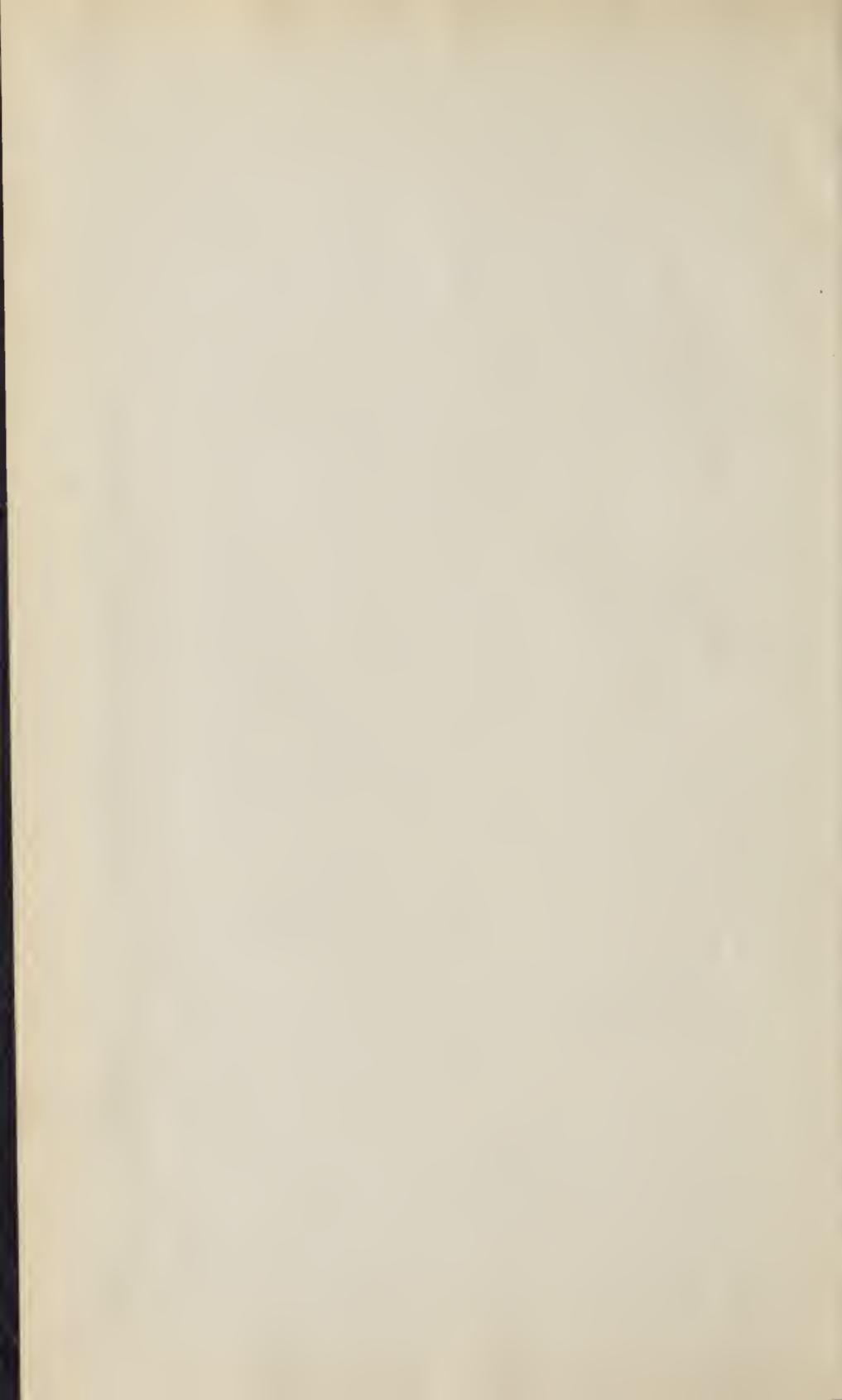
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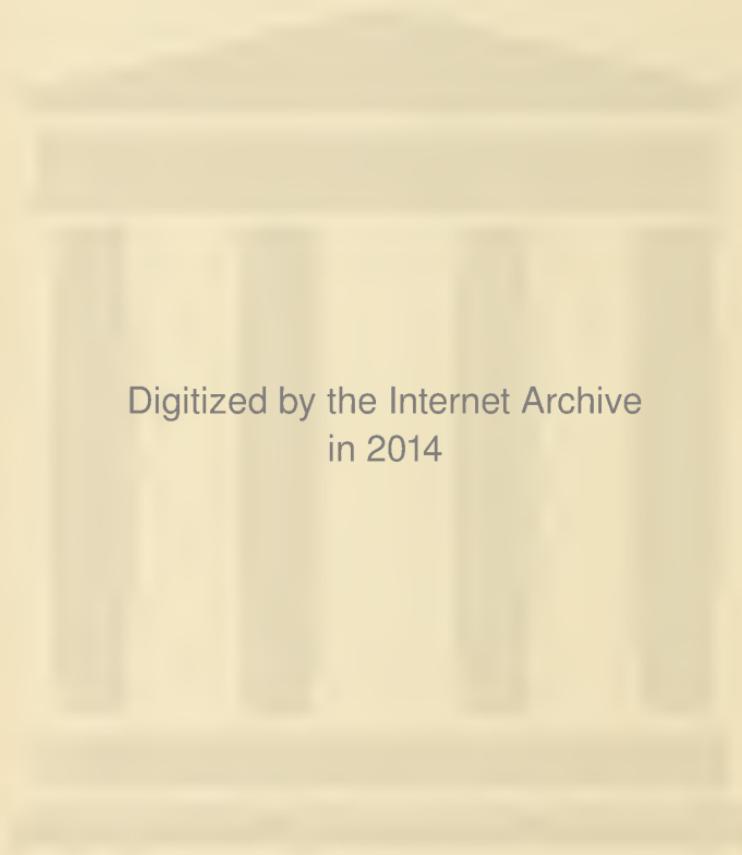
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No. 1.

ORIGINAL ARTICLES.

A WIRE MASK AS AN EYE PROTECTOR AND THE USE OF A SUTURE TO CLOSE THE EYELIDS AFTER OPERATIONS AND INJURIES.¹

BY J. S. PROUT, M.D.

Surgeon Brooklyn Eye and Ear Hospital, etc.

Dr. Michel's suggestion was to use the *taffetas francais*, which I have tried, but Behrle's Transparent American Skin Plaster is equally good. Patients have not complained of irritation from it, but sometimes it is difficult to cause it to adhere on account of its lightness. To remove it from the eyelids it is only necessary to moisten it with water or whatever fluid may be used to cleanse the eye. For this reason no medicated solution can be used while it is in place. To overcome this objection, in a recent case of simple extraction, in which there was chronic conjunctivitis, I closed the eye by means of a suture through the edges of the eyelids, and then

¹An extension of remarks made during the discussion of Dr. C. S. Bull's paper on Simple Extraction of Cataract, at the meeting of the American Ophthalmological Society, July, 1890.

directed instillations of weak solutions of the bichloride and of eserine to be made in alternation. The other eye was closed by means of the plaster as usual. The patient (æt. 80) was allowed to sit up and move about during the day. The stitch caused no irritation whatever, and was removed on the fourth day, when the wound was found well closed; the eye was then closed with plaster and a very satisfactory result was obtained.

I agree with those who believe that no matter how skilfully it may be applied, the bandage makes unequal pressure on the eyeball, and therefore tends to produce faulty apposition of the lips of the extraction wound. Then, again, all of us, no doubt, have found that the bandage worn for several days sometimes causes conjunctivitis in old eyes, and increased vascularity very often. For these reasons the suggestion of Michel² to dispense with it and to close the eye after cataract extraction by means of the plaster met with my hearty approval. Its only drawback was that the eye was not thus sufficiently protected from that frequent cause of injury, the patient's own hands, a difficulty that the use of the wire mask here figured has, in very large degree, removed. It consists of a piece of wire netting, such as is used for window screens, about three inches wide, and long enough (about eight inches) to reach from temple to temple, from which, to prevent disagreeable pressure on the nose, a triangular piece is removed. This also assists in keeping it in place. The cut edges are bound with wide tape to protect the skin, and to each corner are sewed tapes to be passed around the head and tied at the temple. This mask stays well in place, does not annoy the patient as much as a bandage, in warm weather, at least; can be removed and replaced without causing any necessary movement of the head, and is an excellent protector of the eye during convalescence. When the ball is prominent, the wire over it can readily be made convex, as shown on one side in the figure, so as to obtain a space of half an inch between it and the eye, and there is resistance enough in it to prevent

²Archives of Ophthalmology, xv., 3, 318.

injury from any ordinary movement of the patient's hands.

Dr. Gifford, in the *Archives of Ophthalmology* (xix, 1, p. 42), has suggested and figured a pasteboard mask for protecting the eye after operations, etc. The wire mask is lighter, cooler, and can be more easily made and adjusted to the face. It was suggested to me in October, 1886, by my friend, Dr. H. W. Skerry, of Brooklyn, who had used it in a case of purulent conjunctivitis to keep flies from the face of the patient.



FIG. I. WIRE MASK.

In this connection I would like to recommend the use of the eyelid suture in operative cases, and also in cases of injury, especially in young children, in whom it is important and so difficult to protect the eye. While the stitch is in place, medicated solutions can be readily instilled, and at the same time the eye has the constant support of its natural protector or splint—the properly curved tarsus—thus keeping the edges of the wound in more accurate apposition than can be otherwise obtained.

The use of the wire mask renders Michel's suggestion complete and, with the occasional use of the eyelid suture, will, it is hoped, be found a useful contribution to eye surgery.

SPECTACLES TO BE USED IN DIVING.

BY DAVID W. STEVENSON, M.D.,

House Surgeon Illinois Eye and Ear Infirmary.

The cornea is the chief seat of refraction. This is not due to its great curvature, but because it separates the two media, the air and aqueous, which show a great difference in their "index of refraction." Now in ordinary diving the action of the cornea is entirely eliminated. The writer was never a great swimmer, but could always dive well, and stay under the water a long time. But the cornea being in contact with the surrounding water, the eye was rendered exceedingly highly hyperopic. Thus an old boot at the bottom of the lake might look



FIG. 2.

as big as a Saratoga trunk, but the large diffusion circles would prevent any recognition of form or detail. Landolt (page 181) gives the average refractive power of the eye at 48.27 Dioptics. The lens provides about 10 D., and of course its action is not interfered with in diving. Therefore 38 D. have to be provided for. It will be quite clear that no convex lens will give satisfaction. Because of the great curvature required, and also on account of the fact that the action of a convex lens is largely obliterated in water for the reason that their *index of refraction* is nearly alike.

The index for air being so low we would still propose to use

that medium by bottling it up. Suppose a little square bottle of suitable size to be blown in a mould so that it will have a cross section the shape as in Fig. 2. It being sealed up with the air enclosed, its action under the water would be the same as a strong convex lens in the air.

It could be made out of annealed glass of uniform thickness, the same as the flasks and retorts used in the laboratory. It might be rendered bi-convex in its interior, or bi-concave externally just as easy, requiring only one-half the curvature for each side, but I expect the refractive part of this glass ought to come as close to the eye as possible.

The curve on the glass or mould would not be near as great as the cornea because of the greater distance from the retina or nodal point.

Having found by experiments the proper curve of the mould, thousands of these spectacles could be blown out quite cheaply. When fitted in a nickel riding frame, with an ordinary saddle (ss) nose piece, they could be made to fit any one, and perhaps would give some pleasure in diving. Many valuables remain lost in our lakes, especially the tourists' lakes, like those of Wisconsin, because of the expense of sending for a diver who, with an elaborate apparatus, has air pumped to him to see and breathe by; also, because by the time he gets there, the valuables are covered.

A startling peculiarity of these glasses is, that they have no effect on refraction in the air. Thus a swimmer could keep them on all the time, their action in the air being nothing more than that of a *coquille* (protective).

THE TREATMENT OF BLEPHORASPASM.

BY FRANK ALLPORT, M.D., OF MINNEAPOLIS, MINN.,

Professor of Clinical Ophthalmology and Otology in the University of Minnesota.

One of the most intractable and annoying little maladies met by the oculist is blepharospasm.

It often becomes a matter of considerable importance to overcome it, especially when it prolongs its stay after the cause is nearly or quite removed, as when its severity is out of all proportion to its cause.

Its treatment is frequently extremely tedious, and demoralizing to the patient's peace of mind and injurious to the physician's reputation.

I have tried all the most approved methods for its relief with the exception of division of the supra-orbital nerve.

I have been unable to see that one remedy possesses any particular advantage over others, and have repeatedly observed cases where, in spite of all that could be done, the malady had simply to wear itself out.

Some cases have been seen, it must be said, where the sudden dashing of the face into a large basin of cold water has appeared to be followed by a more or less beneficial effect; but in general, treatment of this obstinate little malady has been far from satisfactory.

Some three years ago it occurred to me to attack troubles in a similar manner to a spasm of the sphincter ani, viz., by stretching the fibres of the orbicularis. This was accordingly done at my service in the University Free Dispensary in the presence of my class of students. It proved so satisfactory that I have many times performed the procedure during the past three years, both at the dispensary and in my private

practice. Indeed it has become a routine practice with me to always stretch the orbicularis in obstinate and intractable spasm, and it rarely fails to yield an excellent result. The procedure is simple enough and consists merely in placing a strong, short speculum between the lids and opening its blades until it is deemed that the muscle is thoroughly stretched. The speculum is then firmly set and allowed to remain in its expanded condition for about five minutes, when it is removed.

The same result may be obtained by two lid elevators. The procedure is quite painful, and, as a rule, it is better to place the patient under general anaesthesia before commencing. Still I have stretched the muscle in sturdy patients under cocaine anaesthesia.

It is often advisable to repeat the little operation several times at intervals of a few days.

TRANSLATION.

A CONTRIBUTION TO THE STUDY OF TUMORS OF THE EYELIDS.

BY CONRAD RUMSCHEWITSCH, OF KIEW.

Translated from *Klin. Monatsbl.*, October, 1890, by Dr. W. L. Blickhahn,
St. Louis.

It is my intention to describe a number of cases of neoplasms of the lids, in the strict sense of the term, particularly such as, from their external appearance, remind us wholly, or almost so, of a chalazion. Cases which, in their external appearance, differ from the chalazion, will be referred to only because of their relative rarity, or because of peculiarities of structure.

Among the more common neoplasms of the lids are those made up of blood vessels. Weinlechner¹ has collected 23 cases of angioma of the lids. These neoplasms are either cavernous angioma or teleangiectasies. The former develop, as a rule, after birth, and sometimes attain to considerable size. Montgomery² describes a varix aneurysmaticus of traumatic origin, which occupied the whole lid. At the same time angioma may be present in other regions of the body, occasionally spreading over a considerable surface. Michel,³ in his article "On the Diseases of the Lids," cites a case de-

¹ *Wien. Med. Blätter.*, 1882. No. 30, bis 39.

² *Chicago Society of Ophthalmology and Otology*, 1886.

³ *Handbuch. d. gesammten Augenheilkunde v. Graefe and Saemisch*, *Monatsbl. f. Augenheilkunde*, 1890.

scribed by Schirmer, in which the angioma on the right side reached from the lower lid to the upper lip, on the left side from the forehead to the lower lip, besides which it showed itself in the mucous membrane of the mouth and the nose, the connective tissue of the lids and bulbus, the soft palate, even in the pharynx; it also appeared in circumscribed areas on the neck and the right side of the chest and abdomen. The ophthalmoscope showed a dilatation of the veins of the retina in the left eye.

Furthermore, congenital angioma are prone to recur. Michel reports a case, described by McClelland, in which congenital angioma of the lids at first increased very slowly; in the tenth year, however, the increase was so rapid that the neoplasm in the upper lid became one-third the size of a hen's egg; that in the lower lid was as large as a tonsil.

Simon⁴ described angioma which occur in the area of distribution of the trigeminus, as "vaso-motor nævi." Knapp has also described an unusually rapid growth of an angioma, originally congenital—a child, æt. 15 months, in which both lids, the orbit, the nose, the eyebrows and the region behind and below the ear, were the seat of the trouble.

Dilatation of the palpebral vessels, even small angioma, may be caused by obstructions in the circulatory system of both lids, or even of a circumscribed area of one lid. We always observe a marked dilatation of the subcutaneous veins (their diameters reaching even 0.5 cm.) when the volume of the lids has been increased, due either to the presence of large tumors in them (for instance, in amyloid degeneration), in cases of large staphylomata, or even to the increase in the size of the eyeball, owing to the presence of a growth within it.

Small angioma of the skin of the lids are found in the covering of an old chalazion. Not long ago I had an opportunity to examine such a case anatomically.

J. D., a man, æt. 32 years, consulted me in 1884 in reference to a rather large chalazion (it was the size of a bean), situated

⁴Arch. f. Dermatology and Syphilis, 1872, 14.

on the inner half of the right upper lid. I suggested an operation, which the patient declined. Up to the end of 1889 there was no enlargement observed, but the skin had become thick, of a bluish color, sprinkled with fine, red dots, was soft and movable, and had a pointed elongation in the centre, which was about 2 mm. higher than the surrounding surface. The alterations in the skin, above noted, were seen to occupy an area a little less in extent than the greatest diameter of the chalazion. After turning the lid, I made an incision as long as the whole length of the chalazion, and removed its contents with a sharp spoon.

After two weeks, all evidences of the chalazion having disappeared, the color in the skin remaining, it became necessary, for cosmetic reasons, to remove the skin.

Microscopic examination showed, besides a general marked dilatation of the vessels, more particularly the venous vessels of the skin and the subcutaneous layer, and a slight infiltration of the tissue with leucocytes, a rather marked hypertrophy of the papillæ, in each of which a thick loop of vessels was seen. These loops appeared macroscopically as red dots on a blue background.

Michel describes protuberances the size of a pea, of a pale red color and smooth surface, in the outer angle, particularly in the region of the outer lid margin, which develop very slowly—their apices appear translucent. Their structure was that of fibrillar connective tissue, with here and there large alveoli. The walls of these spaces were lined with endothelium, the contents a finely granular material, containing leucocytes. Michel correctly considers these neoplasms as cavernous lymphangiomata.

Stadler⁵ saw in a new-born child, shortly after birth, a soft tumor the size of a pea, in the centre of the left eyebrow. The tumor continued growing, and after two years was so large as to make it impossible for the child to lift its upper eyelid. Toward the middle of the fifth year the tumor did not only oc-

⁵Ein Beitrag zur Lehre von der Lymphangiomen.—Dissert. Wuerzburg, 1886.

cupy the left side of the forehead, and the whole region as far as the lid margin, but it even reached up to the upper border of the ear. The tumor was soft, and movable in its whole extent, and an examination of its structure showed it to be a cavernous lymphangioma.

I observed the following case: A. O., male, æt. 52 years; conjunctiva somewhat congested; patient furthermore complains of stillicidium lacrymarum. The lower lids are thickened and oedematous. Urine normal. On the right lower lid, at a distance of 3 mm. from the outer angle, wholly in the outer lid margin, a neoplasm is seen the size of a pea, and of a pale red color, with a pale, yet transparent, apex. In the middle of the lid a similar, though smaller, neoplasm was seen, which was also situated in the region of the outer lid margin. Its apex was, however, not so transparent, and was not elevated above the level of the surrounding parts. Three similar neoplasms were seen on the outer lid margin of the left lower lid; they were, however, not larger than a millet seed. One of these was situated close to the punctum lachrymale; the other two were in the outer angle, almost contiguous to one another. According to the patient, these growths made their appearance gradually in the course of three years. I removed the tumor from the outer angle of the left lower lid for microscopic examination.

Below the epidermis and rete Malpighii, which were normal, a thin layer of cutis tissue proper was seen, which was almost without blood vessels; in the neighborhood of the growth papillæ were entirely absent. Further toward the centre a fine network of bundles of fibrillar connective tissue was seen, which was covered by endothelium. In the centre of the neoplasm the alveoli were much larger; they could be traced to the apex of the growth—that is, to that part which appeared the most translucent. The alveoli were filled with a finely granular material, in which here and there a lymph capsule was to be seen. This granular material is of post-mortem origin, for during life the alveoli were doubtless filled with lymph. The defect in the tissue after removal of the growth was so slight that

it was possible to be satisfied with simply dusting iodoform into the wound. The remaining three tumors were not excised, but treated as follows: After cutting off the translucent top or apex with a sharp pair of scissors (after which procedure in every instance a drop of yellowish fluid appeared), I curetted what remained of the neoplasm. The haemorrhage was slight, and the growths disappeared entirely within a few days. I had an opportunity, some months later, of again examining the patient, and found the lower lids normal; the oedema had disappeared and the conjunctiva had become paler.

Of all the neoplasms of the lids the epithelioma, in the shape of a papillary growth, either superficially or deeply situated, is surely the most common. Just here I will relate a case belonging to the latter class, which may prove of interest because of its extraordinary slowness of development.

A. S., male, *aet.* 56 years, relates that in his 24th year he observed a small wart on the upper lid of his left eye, which, later on, began to grow, and after about three years had attained the size of a pea; the surface was uneven and rough. Shortly thereafter the tumor changed shape, becoming pediculated, and after about two years it fell off. In his 35th year the patient again noticed a growth, and in the same place. Its course was the same as that of the previous one, and after six months' time it also fell off. During the next five years the patient observed at the site of the tumors only a yellowish, somewhat elevated, spot of small size. In his 48th year this spot began to enlarge, and after a lapse of eight years I found the following conditions: The eyeball, conjunctiva and lower lid are normal. On the lower half of the upper lid a neoplasm is seen, which is 12 mm. long, 10 mm. wide, and has an elevation of 12 mm. above the surrounding tissues. The outer border of the tumor is 6 mm. distant from the outer canthus. The lower border occupies the outer edge of the lid margin to the extent of the length of the tumor, but very few cilia remain. The tumor moves with the skin and is not connected with the tarsus, is of a dirty rose color, uneven surface, and bleeds as

soon as it is not tenderly manipulated. Diagnosis: Epithelioma of a papillary form, which, possibly, developed from a simple papilloma.

As the conjunctiva and tarsus of the upper lid were normal, and the tumor was not adherent, and because the tarsus is not apt to be invaded by epithelioma, I decided to remove the neoplasm as follows: I divided the tarsus into two plates, as in the Jaesche-Arlt operation, continuing the incision until I had passed the upper border of the growth. Then I made two incisions in the normal skin and the normal edge of the free lid border, perpendicular to the former, and after having lifted the anterior plate of the tarsus, together with the neoplasm, I saw that the remaining tissue was normal. Lastly, I made the upper horizontal cut, by which I removed the growth. In order to cover the defect which resulted, and which was a square centimeter in size, I prolonged the two upper vertical incisions and sewed the resulting flap to the lid margin with three sutures.

The microscopic examination showed that a short distance from the border of the excised normal skin the sebaceous glands appeared hypertrophied, and further toward the centre formed epithelial cylinders, of which the mass of the neoplasm was entirely made up. These epithelial cylinders were also found in the removed portion of the orbicularis, although some muscle fibres in the deeper layers appeared perfectly normal. No changes were found in the excised plate of tarsus. The neoplasm was so simple that neither hair nor glandular structure could be found within it. In the lower portion a changed hair follicle lay here and there. Remains of altered sudoriferous glands were also scarce. The wound healed *per primam intentionem*. Although the operation was done two and a half years ago there is as yet no recurrence.

I will now speak of the new growths, whose clinical picture, if at all, differs but slightly from that of a chalazion. I will first refer to a number of cases described by Fuchs in his article on the chalazion and several rare lid tumors.

1. Adenoma of the sweat glands. A movable tumor, 1 cm.

in size. The hair follicles are surrounded on all sides by the growth, and the sebaceous glands are atrophied. Fuchs found in cross sections two kinds of cylinders—true ones, filled with cylindrical epithelium, and newly formed ones of irregularly arranged pavement epithelium.

2. Adenoma of the sebaceous glands. On the upper lid was found a tumor the size of a pea, composed of two parts. The growth is encapsulated, and numberless septa enter the growth from the capsule. The acini consist of epithelial cylinders without a lumen. Their structure reminds one of glands that secrete sebum, such as the sebaceous or Meibomian glands, but they have no lumen; fat cells were not present in the acini. Fuchs does not, however, come to any conclusion as to the origin of the growth.

3. Adeno-carcinoma of the lids. A growth attached to the tarsus, 1 cm. in size. The stroma was composed of fibrillar connective tissue, and fibro-cartilage and elastic cartilage. In this stroma groups of epithelial cells were enclosed which, here and there, resembled adenoid tissue. Fuchs is of the opinion that the carcinoma took its origin from the Meibomian glands or glands of Krause, situated in the tarsus.

4. Enchondroma of the tarsus—a tumor the size of a pea, very closely united with the tarsus. The structure resembles very much that of cartilage. The fibres, hard, formed spaces which appeared on longitudinal section long; on cross section, spindle-shaped, round or triangular; all the spores were connected one with the other, and surrounded by a membrane containing nuclei. The growth contained but very few blood vessels. No clinical history was presented with the four cases just mentioned.

5. Sarcoma of the lids.—A man, *aet.* 24 years, had a tumor the size of a nut on the outer half of the left upper lid, which was not connected with the skin nor conjunctiva. The microscope showed it to be a spindle-celled sarcoma which, here and there, had undergone a mucoid degeneration. Occasionally the remains of degenerated glandular tissue (accessory lachrymal glands) were found, which Fuchs looks upon as the origin of the tumor.

Lastly, Van Duyse and Cruyl and Randall have described tumors which, from external appearance, reminded one of a chalazion.

The case of Van Duyse and Cruyl⁶ was that of a girl, æt. 7 years, in whose upper lid a tumor appeared, as the result of a blow, which at first seemed to be a chalazion. Microscopic examination showed it to be a myxosarcoma. Randall⁷ found a tumor in a man, æt. 41 years, which looked like a chalazion. It proved to be a recurrence of a growth removed some three years before. The microscope showed it to be a sarcoma. Three years later it returned again, occupying one-half of the lid. It was again removed, though it was expected to again recur.

I will relate two more cases of adenoma of the Meibomian glands. The first case was described by Baldauf⁸. The growth occupied two-thirds of the tarsus of the right lower lid. The patient, a woman, æt. 59 years, stated, that the growth was of four years' standing.

Based on the examination of this case, as also on the literature on the subject, Baldauf comes to the same conclusion as Forster, viz. that of a true adenoma, originating in the Meibomian glands, that is to say, a benign growth dependent on a simple hyperplasia of the gland tissue. The growth of the neoplasm is very slow, and is sharply defined toward the neighboring skin.

The second case was described by Bock⁹. The patient, a woman, æt. 62 years, had a tumor on the inner surface of the right upper lid which was of a pale red color, had an uneven surface and doughy consistence. The microscope showed an adenoma which had its origin in the Meibomian glands.

I will now describe the cases I examined.

⁶An. d'oculistique, T. xcvi, p. 112.

⁷Am. Oph. Soc., twenty-third meeting, 1887.

⁸Dissert. inaug. München, 1870.

⁹Wiener. Med. Wochenschr., 1888, No. 59.

1. *Granuloma of the Lids*.—A. N., æt. 18 years, relates that about three years ago he was struck in the left lower lid by a splinter of wood. At the outer canthus a tumor is seen, 1 cm. long and 7 mm. wide. The skin at this spot is easily movable, but presents a white spot resembling a scar in appearance. Corresponding to the site of the tumor there is a marked redness in the conjunctiva. Aside from this the conjunctiva is normal. The tumor is intimately connected with the tarsus which, furthermore, appears much thickened in its outer half. As I did not find a yellowish-red colored area in the conjunctiva, which is usually present in a chalazion, I decided not to curette, as was my wont, but I preferred to remove the tumor by means of an incision through the outside. During the operation I became convinced that the tumor grew smaller as I came nearer to the conjunctiva, and it proved to be possible to remove it without touching the conjunctiva, which, furthermore, appeared to be perfectly healthy.

After preserving the tumor in a proper manner I made cross sections and began on that part of it which lay close to the skin. After the eighth or tenth section I observed a whitish spot in the center. After about two mms. of the tumor had been cut, the microtome knife gave out a peculiar ring, as if it had struck a hard body; this was easily discernible and the presence of a foreign body was not doubtful, since the specimen was embedded in paraffin. I first removed this by the use of turpentine, then I removed the foreign body with a forceps, and found it to be a piece of wood, which was thinner toward the inside and thicker outside; it occupied a rather oblique position in the growth; its thickness varied from 0.5 to 1 mm. From this on each section presented a central canal which had been occupied by the removed splinter, and became the narrower the deeper (toward the conjunctival end of the tumor) I cut. The growth itself was a typical granuloma, whose origin was due to the presence of the foreign body in the tarsus of the lid. There is no doubt that when the lid was struck with a piece of wood, a short piece entered the lid and broke off. The place of entrance was plainly seen because of the scar.

It is easily seen that on examination no foreign body was found because of its being surrounded on all sides by granulation tissue. The whole tumor was of a uniform structure, except in the region of the tarsus, where remains of Meibomian glands were found in two places.

2. *Adenoma of the Glands of Krause.*—A. N., male, æt. 34 years, noticed during the past four years a slowly increasing swelling of the right upper lid, close to the outer canthus. The right palpebral fissure seemed somewhat contracted, particularly its outer portion. Aside from this, it is evident that the upper border of the tarsus is markedly thickened in its outer half, and that this thickening is sharply defined toward the rest of the tarsus. The growth is inseparably connected with the tarsus; the skin over the growth is, however, freely movable. It is more than 1 cm. long. The gradual and very slow development of the tumor is evidence of its benign character. It may be assumed that the growth sprang from the group of Krause's glands which lie outward from and to both sides of the tendon of the levator palpebræ superioris, not from those in the narrowed portion of the tarsus between the upper ends of the Meibomian glands and the insertion of the levator.

On turning the lid it was easy to see that the conjunctiva of the lids, fornix and eyeball was not involved in the tumor, and that it would be possible to remove the tumor perfectly, with the altered portions of the tarsus, by an incision through the skin, and without injuring the conjunctiva.

The growth was preserved in Müller's fluid. It measured 13 cm. in length, 1 cm. in width, and 15 cm. in thickness. On the inner surface of the tumor a shallow depression was noticeable, which divided the growth in two unequal parts, of which the upper one was smaller, and the lower one much larger. This depression was seen on the temporal and nasal surface of the growth; on the anterior surface, however, it was but slightly if at all marked.

On sections, it was in fact plainly visible that the tumor was composed of two portions of unequal structure.

Although the structure of the growth differed essentially

from that of the adjacent tissue, no capsule was found. The upper portion was made up of alveoli, closely packed, and separated by septa, which were about half the width of the alveoli; only here and there I found broader septa, which were even broader than the diameter of the alveoli. The alveoli were made up of cylindrical epithelial cells, with their broader bases toward the periphery, their apices pointing toward the center. The nuclei were in the thickest part of the cell near the periphery; only now and then a lumen was seen. The septa between the alveoli consisted of typical granulation tissue, and grew broader from above and outward to below and inward, that is, in the direction of the above-mentioned depression, which bisected the growth. Below this depression the structure of the growth changed abruptly. The septa now constituted the bulk of the growth, and the alveoli were very few in number, so that the septa, or simply the stroma, made up nine-tenths of the section. The epithelial alveoli of the lower portion differ from those of the upper part of the tumor, which were uniformly round, in that some of cylindrical form were found with the round form. The epithelial cells retained, however, throughout their cylindrical character, their nuclei lay always near their periphery. The stroma in the lower part of the tumor was made up of granulation tissue and only here and there were well marked bands of fibrous connective tissue to be seen, which, by the way, formed the lower border of the tumor. The epithelium in the neoplasm had retained the characteristic appearance of the site of its origin, so that the lower part of the tumor at once recalled the upper border of the tarsus of the upper lid, especially its inner half, which, as is well known, contains a portion of Krause's glands. In sections from the adult these glands occupy nearly the whole of the upper portion of the tarsus, so that only in a small strip of the tarsus near its periphery, the tissue contains but few cells. In the newly-born, however, connective tissue occurs in excess in all structures, and for that reason the tarsus, or in this case, the stroma of a portion of Krause's and the Meibomian glands appear much more strongly developed than is usual in the

adult; the acini of Krause's glands are much more widely separated. The septa have often a greater breadth than the acini themselves. Furthermore the structure of the tarsus of the new-born, as well as quite young subjects, is peculiar in the possession of quite a large number of cells which is easily seen by comparing sections of the lids stained in hæmatoxylin.

It is plain that this was an adenoma of Krause's glands, the stroma of which was composed of granulation tissue. The difference in structure of the two portions was that in the upper portion epithelial cells predominated, while in the lower ones there was principally granulation tissue.

3. *Adenoma of the Sebaceous Glands.*—S. Z., male, æt. 20 years. Both eyeballs, conjunctiva and three lids are perfectly normal. On the right lower lid to the outside of the punctum lachrymale a small roundish tumor, the size a small pea, is seen. Patient said it took the growth four years to develop; it is connected both with the skin and tarsus, and therefore immovable, has a pale yellow color, and is rather hard. On the conjunctiva of the lid is seen a pale spot, the size of a millet seed. Cross sections of the excised growth showed the skin to be intimately connected with the anterior surface of the tumor at this site; the skin shows an absence of sweat glands and hairs; papillæ are present. The layer of skin is thickened, contains but few blood vessels, and forms a capsule for the tumor. Broad prolongations of the capsule, containing blood vessels, enter the growth. These prolongations form a network, the spaces of which are occupied by epithelial cells. The cells are of various sizes, but appear round on section. Toward the periphery they become more flat, toward the centre quite globular, and are much larger. A lumen in the glandular tissue could not be found; the epithelia resemble strongly the epithelia of sebaceous glands about to undergo a specific metamorphosis. In this case not alone was the whole thickness of the orbicularis palpebrarum involved, but the capsule extended to and was connected with the tarsal tissue.

4. *Atheroma of the Lower Lid.*—M. W., female, æt. 25 years.

Both eyeballs, conjunctivæ and three lids were normal. On the left lower lid, 5 mm. to the outside of the punctum lachrymale, a rather hard, pale tumor, the size of a pea, was observed. Patient states that two years were required for its development. It is adherent to the skin. On turning the lid a bluish surface is seen, such as is occasioned by the presence of a chalazion, though, on removing the tumor, no involvement of the conjunctiva could be found. On microscopic examination, the skin over the tumor was found very much hypertrophied; both layers, epithelial and connective tissue, were changed. No hairs, sebaceous or sudoriferous glands were present. Toward the periphery of the tumor prolongations of the skin are observed dipping into the growth, and are seen to surround nearly one-third of the tumor. On the anterior surface of the tumor the skin formed a fold. Between the prolongations and the skin itself, on section triangular spaces are seen, filled with connective tissue and a few blood vessels. In these spaces well developed sebaceous glands appear, though only in a few sections. Their presence is interesting because of the absence of hairs. The walls of the atheroma were made up of a prolongation or continuation of the cutis and was 1 mm. in thickness; it consisted of fibrous connective tissue, with a few flat cells. The inner surface was lined with squamous epithelium in two rows. The contents were those of an ordinary atheroma.

5. *Adenoma of the Modified Sweat Glands (Waldeyer) of the Lid Margin.*—J. Z., male, æt. 25 years. The lids and conjunctiva of both eyes appear to be normal. The patient became uneasy because of the presence of a wart on the border of the right upper lid, and which he had noticed about a year. It is situated 1 cm. to the outside of the punctum lachrymale, exactly in the centre between the inner and outer edge of the free lid border; it is soft, pale red in color, 2.5 cm. long, not more than 1 mm. broad, and is elevated above the surrounding parts about 1.5 mm. I removed the growth, together with a layer of underlying tissue. I was compelled to remove several cilia of the inner layer, as they were almost in apposition

with the tumor. In making the posterior incision, my intention was to not only preserve the excretory ducts of the Meibomian glands, but also the outer layer of the acini, as there were no grounds for supposing that they were involved in the hyperplastic process. Superiorly, the incision extended more than 2 mm. After removal I found on the anterior surface of the growth several hair bulbs of cilia, and posteriorly, could find no evidence of an emulsion of fat, so that the inner incision did actually fall outside of the territory of the Meibomian glands.

The inferior surface of the tumor presented several orifices, which I took for the mouths of the excretory ducts of the modified sweat glands of the lid, as the growth lay between the cilia and the layer of Meibomian glands. Cross sections of the tumor had a quadrilateral shape, but were wider toward the free lid margin.

This lid margin appeared thickened, the epithelial cells had been transformed into an epidermis of many layers, and the papillæ were hypertrophied. In the anterior portion of the tumor several hair follicles (belonging to the cilia) were found; their sebaceous glands were atrophied. In the upper part of the tumor nothing but connective tissue was found, and this rather thin layer of connective tissue covered the posterior surface of the growth.

The above-mentioned orifices on the inferior surface of the tumor appeared very large under the microscope, and proved to be the openings of the excretory ducts filled with epithelial cells, among them a number of horny cells. More superiorly, the excretory ducts of the modified sudoriferous glands, filled with cylindrical epithelium, are found. Sebaceous glands, with the excretory duct of which the duct of the modified sweat glands unites, I could not find, although I cut up the entire growth. The balance of the tumor, up to the region of the papillæ of the free lid margin, consisted entirely of adenoid tissue which, in section, revealed acini of various sizes, which were, however, for the most part, small and separated from one another by slight bands of connective tissue. The acini

were mostly round, but a few were cylindrical. A lumen was rarely found, and when so, it was near the excretory duct, with which an intimate connection seemed apparent in many preparations. The acini which yet contained a lumen were made up of cylindrically shaped cells; the others contained cells irregular in shape, those at the periphery being flat, those in the centre round.

6. *Dermoid of the Lower Lid.*—K. J., male, æt. 47 years. A little to the outside of the cilia, in the skin of the right lower lid, just in the middle, a round, hard tumor is seen, of a dead white color, and the size of a small pea.

Patient states it was one year growing, though a whitish spot had been seen there for a longer time. A microscopic examination showed the tumor to be covered by a thick membrane, forming a capsule. From the skin a prolongation extends into the growth directly into its centre, reaching almost to the posterior (inner) wall. This proved to be a prolongation from the rete mucosum Malpighii. Surrounding this were found more than ten hair follicles with poorly developed hairs, which had not reached the skin surface. The hair follicles are arranged radially, though the hair bulbs are found against the posterior wall. Sudoriferous and even sebaceous glands are totally absent; the space between capsule and hair follicles is filled with very compact connective tissue. Adjacent to the above-described "dermoid," in an infero-posterior direction, is seen a collection of granulation tissue, which resembles that of a chalazion nodule; in size it is equal to the tumor itself. I am of the opinion that the tumor was a congenital dermoid, and owing to its small size was scarcely noticeable, which, however, later became prominent, owing to the development posteriorly of a chalazion one year previously.

7. *Myxoma of the Upper Lid.*—P. R., female, æt. 18 years. Alongside of the upper border of the cornea of both eyes, sickle-shaped areas of cloudiness, and in the superior fornix of both sides scars are seen. The patient states that her eyes have been in good condition only for the past five years, while formerly, in fact for ten years, she had to give up all occupa-

tion. At present a tumor, which appeared one year ago, is seen, situated on the border of the right upper lid, adjacent to the punctum lachrymale, toward the inner edge. The tumor is pale, soft, 2 mm. long, 1 mm. wide, and has an elevation of 2 mm. Further, the base is narrower than the extremity, which, in closing the lids, covers the punctum, on account of which the patient is troubled with *stillicidium lachrymarum*.

The microscope showed the tumor to be covered by a very thick layer of epithelium, which epithelium does not differ from that at the inner side in any particular. From the antero-superior surface of the growth offsets or prolongations are seen to extend into it, made up of epithelium, and forming a rather regular system of vertical branches with free extremities. Between the branches is seen a material of very slight refractive power, containing a few cells, some round, but mostly star-shaped or spindle-shaped. In the region of the base of the growth this mucoid tissue gradually changes to connective tissue. Blood vessels are scarce, and are found in the base of the tumor only. Close to the border of the tumor I found quite a number of small spaces in the myxomatous tissue, which were lined with pavement epithelium.

8. *Papilloma of the Upper Margin of the Lid*.—A. S., male, æt. 22 years. The eyeballs and conjunctivæ are normal. In the middle of the right upper lid, internally to the cilia, a wart is seen, about 2 mm. long, somewhat less in width, with an uneven, interrupted border, serrated, pediculated, pale, even paler than the surrounding skin. Time of growth four years. On cross section the growth appeared like a folded leaf, made up of five smaller, rather long parts. The wart was made up of loose connective tissue, containing but few blood vessels, covered externally by a rather thick layer of skin.

9. *Adenoma of the Meibomian Glands*.—S. Z., male, æt. 24 years. The eyeballs and conjunctivæ are normal, as are also both left and right lower lids. A tumor, the size of a pea, is seen on the right upper lid, 4 mm. from the free lid border. It is soft, connected with the tarsus, but not involving the skin, which is freely movable. Turning the lid and observing no

pale spot on the conjunctiva, I proceeded to remove the growth by means of an incision through the skin. The microscope showed the inner part of the tumor to be tarsal tissue, containing acini of the Meibomian glands. Anteriorly, the connective tissue was seen in loops, and in the tissue there were here and there to be seen unchanged striated muscular fibres; between the connective tissue fibres many flat cells are found. The loops are filled by acini of different size and form. The larger acini are round, and compared with the acini of the Meibomian glands, are much smaller. The others have a long drawn-out, even cylindrical appearance. All those acini are made up of epithelial cells. A few of the round acini differ in their structure from the acini of the Meibomian glands, in that not only one or two layers, but a number of layers of cylindrical, cubical or round cells are found in the periphery; toward the centre, however, numberless degenerated cells are found in fatty degeneration. These acini are seen more particularly in the periphery of the tumor; toward the centre, however, the round acini appear much smaller, and in their centre there are no cells which have undergone fatty degeneration; in their place, however, are numberless round cells. The long acini appeared very much the same; the cylindrical ones, however, were filled with round cells; no lumen is to be seen. In the thickest part of the growth I found a very much flattened excretory duct, in which a very narrow lumen was yet to be seen. The walls were intimately connected as well with the round areas (which differed from those of the Meibomian glands in that they contained cells having undergone fatty degeneration only in their centre or not at all), as also with the cylindrical ones, whose structure, as already detailed, differed very materially from that of the acini and excretory ducts of the Meibomian glands. Furthermore, on the walls of this duct roundish massive buds were seen, totally composed of round cells.

In the case referred to, it seems, therefore, that the hyperplasia of the epithelium of the Meibomian glands took precedence, and the picture observed reminds one of the embryonic structure of the glands, as well as of changes which occur during a traumatic inflammation.

CORRESPONDENCE.

FLUORESCEIN.

CHATTANOOGA, TENN, December 3, 1890.

EDITOR AMERICAN JOURNAL OF OPHTHALMOLOGY.—My limited experience with fluorescein seems to warrant the following conclusions:

1. Of the two varieties the red (flourescein) and the yellow (flourescein) neither is preferable, the yellow being as effective as the red.
2. The solution, grs. x, ad oz., is non-irritative, both to the normal and to the inflamed conjunctiva and cornea.
3. The solution has no effect on the normal tissues.
4. Where there is any solution of continuity of the anterior part of the cornea, there is a greenish discoloration, (superficial keratitis, abrasions, ulcers).
5. The abrasion of the anterior layer of epithelium reduced by the instillation of cocaine does not show this effect.
6. In parenchymatous keratitis there is no discoloration.
7. It is useful mainly in locating foreign bodies and in cases of ulceration where there is much photophobia and the examination is difficult.
8. It has failed me several times in locating foreign bodies, so that the negative diagnosis is not established by a failure of the solution to discolor the cornea.

FRANK TRESTER SMITH.

NEWS.

CATARACT OPERATIONS AT THE PRESBYTERIAN EYE, EAR AND THROAT CHARITY HOSPITAL OF BALTIMORE CITY.

Dr. Julian J. Chisolm, the surgeon in charge of the Presbyterian Eye, Ear and Throat Charity Hospital of Baltimore, in his Annual Report to the Board of Governors, mentions that during the year 1890 493 cataract patients had applied at the hospital for treatment. Of these, 178 were operated upon, 93 were cataract extractions without iridectomy; 20 were senile cataract extraction with iridectomy; 18 soft cataracts were treated by division; 38 capsular cataracts were divided; 81 thick capsules were extracted, and 1 senile cataract in an old man was needled to hasten the maturition.

Since the opening of the hospital, January, 1878, now 13 years, 4,048 cases of cataract have applied for treatment; 1,238 have been operated upon. Dr. Chisolm's cataract operations exceed 2,500, which places him among the most experienced in this special line of work. For the past five years he has treated his cataract patients in light rooms, with the eye not operated upon left open, so that they can take care of themselves, as they were accustomed to do before operation. The eye operated upon is kept closed by a piece of isinglass diaphinous plaster for five days only. At the end of this period the plaster is removed and no more dressings are applied. The eye from this time on is left open to day light and to use, without smoked glasses or brow shades. In two weeks from the day of operation the patient, as a rule, is ready for discharge without having been confined to bed for one single day of treatment.

In the last five years, several hundred cataract extractions have been treated after this open method. From this very large

experience the surgeon is convinced that those surgeons who keep their cataract patients in dark rooms, obtain no benefits from the restraints which they enforce. To say nothing about the bodily and mental discomforts which accompany the bed treatment, with both eyes bandaged, he says that, from his experience with both methods, he finds, that convalescence is positively retarded by keeping patients in the dark. When cataract patients have enjoyed the liberty of moving about in a light room from the moment of operation, the eyes never indicate much weakness. At the end of two weeks from the day of operation they can better stand the exposure to strong light than can eyes six weeks after operation when treated by the methods of confinement, as usually practiced.

In his 25 years' experience as an eye surgeon he has never had occasion to secure the hands of a single patient, and is not aware of any injury to a single eye from this liberal treatment. He believes that if the lid be kept closed over the eye operated on only, so as to give to the cut cornea the perfect support which the tarsal cartilage ensures, it matters but little if the palpebral split gapes somewhat, allowing the light of the room to be admitted to the eye from which the extraction has just been made.

In many of his extractions the patient could peep between the partially closed lids during the whole treatment, and yet no harm followed. Good sight and no inflammation was found when the plaster was finally removed on the fifth day, the period at which the corneal cicatrix has become firm enough to require no further support. He finds the wide-spread belief that the movement of one eye must influence injuriously the eye recently operated has no foundation in fact, and that, therefore, the closing of both eyes is an unnecessary annoyance.

The number of entries in the Case Book of the Hospital for the year 1890, was 9,096, with an aggregate attendance of 33,036, an average of 115 patients for each day of the year.

[Similar reports of other Eye Hospitals and Infirmarys will be published if sent, in manuscript, to the editor.—ED.].

SOCIETY PROCEEDINGS.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, DECEMBER 11, 1890.

HENRY POWER, F.R.C.S., President, in the Chair.

ON SOME POINTS IN THE DEVELOPMENT OF CATARACT.

Mr. W. A. Brailey read this paper, in which he said that excluding the congenital and zonular forms, and also the cataracts secondary to other causes (whether local, as for example, glaucoma or iritis; or general, as diabetes) 7% of the total cases seen in private practice were found to have some degree of opacity of the lens; but only one on the average out of these seven patients had his cataract sufficiently advanced to justify the operation of extraction. From examination of the records of all patients with immature cataract that had been re-examined within the last two years, it was found that 45% of them remained absolutely unchanged for the worse; the intervals between examination and re-examination varying between three months and eight years. Four other cases had even got slightly better as regards vision, thus making 58% in which the sight had not deteriorated. Twenty-three per cent had got decidedly worse, inclusive of 4 cases (13%) in which the cataract was sufficiently advanced to justify removal under ordinary circumstances. The slight improvement of vision in 13% of the cases was attributed to the hygienic measures adopted with regard to the use of the eyes. It was observed

that the cataracts which had remained stationary or improved were mainly of the cortical variety, as shown by the presence of peripheral striae or fissures in the lens, whereas those getting slowly and steadily worse were mainly nuclear. Other differences were found between the two groups since the cortical variety was attended, in about two-thirds of the cases seen, both at the onset and for long afterwards, by irritative symptoms, such as conjunctivitis, photophobia, lachrymation, slight redness of the optic discs, and by aching in the eyes and head, especially on use of the eyes. There was often also a slight increase in the refraction, and some augmentation of the power of accommodation, with occasionally slight spasm of accommodation. Finally it was suggested that while the senile nuclear cataract was a degenerative change, the cortical exhibited often the characters of an inflammation.

The President said the views put forward by the author of the paper were much in accordance with general experience. He mentioned some cases in point, now under his care. He recalled an axiom of Sir William Bowman's, never to operate whilst a patient could see to read with either eye. The rate of development of cataract varied much in different individuals, and probably depended in part on constitutional causes; but in some cases its progress appeared to be delayed by hygienic precautions, more particularly with regard to rest for the eyes and attention to the general health. He was unaware of the condition having ever actually disappeared spontaneously. Mr. Power also spoke of the possibly progressive nature of lamellar cataract. He knew of no facts which would enable him to hold out any promise of recovery from cataract without operation.

Mr. Silcock said that cases like those described by Mr. Brailey were familiar to most ophthalmic surgeons, but he thought the group of symptoms associated with one class of cases to which Mr. Brailey had drawn attention might prove of value in prognosis.

Dr. W. J. Collins mentioned the case of a woman in whom cataract had been diagnosed by Sir William Bowman twenty-

five years previously, and a sketch made. The cataract was still immature. He thought the myopia occurring in cataractous eyes was referable to the increased density of the lens; he had found an increased percentage of solids in cataractous lenses.

Mr. Waren Tay was interested in Mr. Brailey's account of the symptoms, other than failing vision, which were present in cases with immature cataracts.

Mr. McHardy said that in his opinion evidence was wanting that much use of the eyes hastened the maturation of cataract, and he advised patients to make free use of what vision remained. He thought that the altered state of refraction was due to change in the refractive index of the media, and varied to some extent with the general health.

PARESIS OF THE EXTERNAL RECTI.

Mr. Doyne, Oxford, exhibited and read notes of a case he had brought before the Society last session with the above title. He now thought the condition was more correctly described as spasm of convergence. The patient, a lad, *æt.* 17 years, now had vision of $3/xvi$ with each eye separately, and J. 8 when holding the types at three inches from his face. His eyes were usually in a normal position, but as soon as examination was begun, spasmodyc convergence showed itself. The refraction was always myopic, though the degree varied; under atropine, however, a low degree of hypermetropia became manifest. Extreme restlessness and sighing and profuse perspiration when under observation were noticeable symptoms. Mr. Doyne thought the case was one which might be classed as neurotic, but suspected also that there was deliberate malingering.

PARALYSIS OF EXTERNAL RECTI MUSCLES AFTER DIPHTHERIA.

Mr. A. Stanford Morton read notes of four cases of paralysis of the external recti due to the poison of diphtheria. Three of these patients came under his observation during the last

ten months, and the fourth was a patient of Mr. Tay in 1876. They all complained of somewhat similar symptoms such as "crossing" of the eyes and "seeing double," together with more or less defective sight, weakness of the limbs, and staggering gait. From a study of the cases it appeared that the paralysis of the *externi* came on in from four to seven weeks after the sore throat. Its shortest duration was four weeks and in one case it was still in existence having been present twenty-six weeks. In addition to the paralysis of the *externi* there was in one defective action of the superior and internal *recti*. The pupils acted well to light and convergence in all the cases. The accommodation was affected in three of the cases; being absolutely paralyzed in one. Loss of the patellar reflex was very marked. The shortest period in which this symptom was recovered from was three months. In two of the cases the reflex was still absent after a period of twenty-six and sixteen weeks respectively. These cases were reported because of their apparent infrequency.

Dr. Sidney Taylor, Norwich, referred to a case of paralysis of the external *recti* following epidemic influenza.

SUPPOSED SANGUINEOUS LACHRYMATION.

Mr. Richardson Cross read an account of this case occurring in a lady, *aet.* 21 years. She was seen in June, 1889, on account of slight follicular conjunctivitis of the left eye, and discomfort referred to the inner part of the upper lid. On July 2, she returned saying that a lotion of cupric sulphate and cocaine ordered at her first visit had caused considerable inflammation, and that on two or three occasions blood or a blood-stained tear had suddenly suffused the eye and fallen down the cheek. A cold douche for the eye and an iron tonic were prescribed, and some days later the patient again presented herself directly after a drop of blood had fallen. There was a small red-stained fibre in the canaliculus and a similar thread under the lower lid. No ulcer or hæmorrhagic spot could be discovered, but the eyeball looked redder than be-

fore, and the plica semilunaris was swollen and congested. After the lapse of a year, during part of which period the symptom was absent in spite of somewhat impaired health, the patient returned complaining that one or more drops of blood-stained tears or blood, such as might come from the nose, suddenly suffused the eye and fell down on her book or her work, at all times, every two or three days, and even two or three times a day. The tear had been observed to come as if from under the inner part of the top lid to run mainly along the plica and the caruncle under the lower lid, and left a blood stain on whatever it fell. Blowing the nose showed that a mere tinge had passed through the lachrymal canal. Stooping seemed to encourage the blood flow. It had often occurred while kneeling in church, and her mother had on several occasions taken little red films or clots from under the lower lid or from the inner side of the eye. The bleeding continued in spite of treatment by large doses of iron, which improved the general health. In October the patient came again immediately after some blood stained tears had fallen; there was still a small red fibre or clot between the plica semilunaris and the caruncle, and another under the lower lid. The conjunctiva especially at the plica was congested. At the end of the month the patient was walking with her mother when she stooped down to tie her shoe-lace, and at once the eye bled. Within a few minutes she was seen by Mr. Cross. The eye looked blood-stained, a red film was in the conjunctival sac as before. Several spots of blood were on her handkerchief, which were tested with guaiacum and hydrogen peroxide, and gave a definite blood reaction. The eye sac was carefully examined; no spot could be detected from which the bleeding seemed to have occurred, the caruncle was slightly swollen, the plica distinctly so, and its vessels congested. Mr. Cross said there could be no doubt of the accuracy of the facts as stated by the patient. The symptom was a most exceptional one, and the literature in connection with it very scanty. Hasner and De Wecker had alluded to it, the latter in connection with scorbutics. There had been no tendency to other

hæmorrhage, no indication of hysteria, and the patient was very anxious to get rid of the malady. She had been at times distinctly anaemic.

Mr. Waren Tay asked if the blood had been examined microscopically.

Mr. Hartridge inquired if the lachrymal gland had been examined from the conjunctival surface.

Mr. Cross replied that the blood had not been microscopically examined, and that no abnormal appearances could be detected beneath the upper lid. The patient was not a bleeder.

SELECTIONS FROM AMERICAN MEDICAL JOURNALS.

PYOKTANIN IN DACRYOCYSTITIS.

BY E. DE SCHWEINITZ, M.D.

In the December number of the *Magazine*, Dr. G. M. Gould records his experience with blue pyoktanin in the treatment of a variety of superficial ocular inflammations, and lays particular stress upon its value in dacryocystitis and lachrymal conjunctivitis. He states:

"In chronically unhealthy conditions of the lachrymal excreting apparatus, I have found it to work like a charm in cleansing the channels and drying up the abnormal secretions. When the canaliculi or ducts are closed by constriction, they may be rendered patent by the usual methods, and with pyoktanin a quick cure thus effected. But there are many cases where the obstructed outflow is in part due to the inflammation and congestion caused by the presence of unhealthy tears and conjunctival disease, and in such cases, without other means, a drop of pyoktanin in the lower conjunctival sulcus, repeated twice a day for a few days, will work wonders. To the great diffusibility of the solution this effect is doubtless in part due."

My experience with the drug is in entire accord with the sentence just quoted from the paper of my colleague. I have used pyoktanin in a number of inflammatory affections of the cornea and conjunctiva with very indifferent success and often with disappointing effect, but in diseases of the lachrymal passages, especially when associated with accumulations of purulent or muco-purulent secretion in the tear sac, it is in many

respects the most efficient remedy, in the rapidity of its curative influence, I have employed. Its value depends upon its pus-destroying properties and, as has been suggested, its great diffusibility. The latter quality is well illustrated by the following case:

C. D., a boy, æt. 6 years, had from birth suppuration of the right lachrymal sac and closure of the nasal duct. Pressure over the slightly bulging area of the tear-bag caused the exudation from both puncta of a thick, muco-purulent discharge. The lower canaliculus was slit and an endeavor made to pass a probe, which met with a firmly resisting stricture just beyond the lower part of the sac, or beginning of the nasal duct. The probe was not forced, neither was the stricture incised. Blue pyoktanin (1-1000) was injected into the sac. The next day the suppuration had diminished considerably, and on the third day only a slightly tenacious, clear fluid exuded from the puncta. The pyoktanin injections were repeated for three days, when, although no change had taken place in the character of the obstruction and no probe had been passed, a little of the solution found its way into the inferior meatus of the nose. A naso-pharyngeal examination revealed an abnormal shape of the lower turbinated bone of the right nostril and evidences of a severe rhinitis during the past. Treatment of this condition was undertaken by Dr. Alexander MacCoy, and after a few days the stricture was incised, the probe passed and the usual treatment instituted with very rapid improvement.

This case is interesting chiefly because, although an ordinary antiseptic solution like bichloride of mercury could not be forced through the stricture previous to its incision, the pyoktanin found a way.

Rapid cessation of suppuration in the lachrymal passages under the influence of this drug is illustrated by the following cases:

Mrs. D., a woman, æt. 50 years, with long-standing, chronic dacryocystitis, suffering from acute exacerbation, with free secretion of purulent matter from the left sac associated with blepharitis and some ectropion, received for three days a

pyoktanin injection after slitting of the canaliculus. At the end of this time the purulent character of the secretion had ceased. The drug was now substituted by a solution of bi-chloride of mercury and the usual treatment continued, with very happy results. It may be stated that the blepharitis during the three days that the analine dye was used showed no improvement, but yielded rather speedily to an aristol salve.

Mr. B., a gentleman over 80 years of age, had for many years obstruction of the left nasal duct and muco-purulent discharge from the tear sac of the same side. He had never permitted treatment until recently, when, as he was about to undergo a cataract extraction upon the opposite side, in which there was no suppuration in the lachrymal passages, but only a slight chronic conjunctivitis, the left canaliculus was slit, the nasal duct probed and the sac washed out with the pyoktanin solution, which passed freely into the nose. The next day there was marked improvement, the fourth day there was only a slight gummy discharge, and at the end of a week the abnormal secretion had absolutely dried up.

The next illustrates the point made by Dr. Gould and other observers, that in lachrymal conjunctivitis the drug often does good without its injection into the sac or nasal duct, simply by placing a drop or two of it daily in the lower conjunctiva sulcus.

A hospital patient, æt. 57 years, had upon the left side an old stricture of the nasal duct, which in times past had been probed, but which recently had not been treated. There was slight distichiasis with some pannus in the lower portion of the cornea. The eye was tear-soaked, and pressure over the right lachrymal sac caused the exudation of a few drops of muco-purulent discharge. Without reopening the stricture pyoktanin was dropped into the conjunctival cul-de-sac, with improvement in 24 hours; and with such marked benefit at the end of a week that a semi-luxated, cataractous lens was removed from that eye with rapid healing of the wound. The ultimate result of vision to this man was not very good, owing to considerable vitreous disease and patches of atrophic cho-

roiditis, but there was no reaction from the operation and no more irritation than could be accounted for by the fact that the man had suffered from misplaced cilia, which rubbed against his cornea. This fault was corrected before the lens was extracted.

These cases will suffice to show that the drug certainly exercises a very beneficial influence in drying up the abnormal secretions of the lachrymal passages. Further than this, however, it does not appear to have marked effect, and it has been my practice, after the cessation of suppuration, to substitute for it one of the well-known antiseptics. In most of the cases blue pyoktanin has been used; in a few treated with the yellow variety the result was not so good nor the application quite so free from irritation. However, my experience with the latter form of the remedy is very limited. Dilatation of the pupil following its use was not observed, neither was there any staining of the deeper structures. No particularly good effect occurred in eye affections other than those associated with the formation of pus, and in some cases of corneal ulcer the disease was apparently aggravated by the application of the remedy.—*University Med. Mag.*

SOME DISPUTED POINTS IN THE CORRECTION OF REFRACTION ERRORS.¹

BY B. ALEX. RANDALL, A.M., M.D.

In the entire range of ophthalmology there is probably no question as important as that of how to deal with errors of refraction. The sum total of discomfort, disease and impaired vision fairly ascribable to ametropia is unapproachable by that due to any of the grave disorders to which the eye is subject; and glasses are being prescribed with ever-increasing frequency and by a rapidly widening circle of medical men. Yet it is very unfortunate to note the wide divergence in the views of men who ought to be authorities in such matters; and the acrimonious criticism with which some of them assail the work of others, attacking them even before the laity with a vigor which ill accords with professional, or even common courtesy, and can be justified only by scientific demonstrations, as yet lacking, that the treatment thus condemned is unwise and harmful.

As there are many whose views in this matter are not very definite, I have felt that in placing on record the conclusions that I have reached in ten years of close and conscientious study, I may perhaps aid some in reaching clearer views and more satisfactory results. Without claiming any originality, then, but apologizing to those who may be bored by this re-travelling of much-trodden paths, I will touch upon some of the points in dispute.

First, as to the frequency of ametropia. There are proba-

¹Read in the Section of Ophthalmology at the Forty-first Annual Meeting of the American Medical Association, at Nashville, Tenn., May, 1890.

bly few now remaining who will uphold the old view that the majority of people are emmetropic. The investigations of the eyes of infants and school-children have proven beyond any reasonable doubt that the young human eye is almost invariably hypermetropic, that astigmatism is extremely common, although not always easily uncovered, and that myopia—the bugbear of our German cousins especially—is almost invariably developed during the school age.² But from this point wide divergence begins. The rule that has been proven for children, is quite generally held to be inapplicable to adults. It is considered entirely natural that the immature child should present the undeveloped type of eye; but also that he should outgrow it later, as he does many other childish things. The general existence of emmetropia in adult life is claimed upon *a priori* ground, and has really been but rarely questioned; yet it needs only a rational questioning of the view to show that it is baseless. Hardly one cornea in twenty is free from measurable astigmatism, as the modern handy ophthalmometers clearly show (Javal, Nordenson, Schiotz, Burnett, *et. al.*) So, too, as to axial ametropia, the few investigations made among adults, falling far short of the whole truth as they generally do, still show that not one-half could be looked on as emmetropic. Incomplete as the demonstration is, it is quite enough to throw the burden of proof upon those who would maintain the *a priori* view. Thus, it has been demonstrated by Seggel that among the common soldiers in Munich 40% of the 3,052 eyes studied had *manifest* hypermetropia, and only 46% appeared emmetropic; yet they were healthy young adults from among whom all notably abnormal had been excluded by the enlistment examination. Stricter study would have greatly reduced this group of apparent emmetropes, just as Roosa³ found among 20 eyes carefully selected as free from *manifest* hypermetropia only 6 which were actually emmetropic under

²Randall, "The Refraction of the Human Eye," Amer. Jour. Med. Sciences, July, 1885.

³Trans. Am. Oph. Society, 1878.

atropia—the rest revealing hypermetropia of .65 to 1.5D. In a study of the eyes of medical students, I found with the test glasses, among 142 eyes, 51 apparently emmetropic, 54 myopic, and only 37 with manifest hypermetropia; yet the ophthalmoscope and other methods proved that full 92 were hypermetropic, only 19 myopic, and at most 31 emmetropic.⁴ Of the 51 eyes which rejected convex glasses and seemed emmetropic, only 16 appeared so by other tests; and the use of a mydriatic would have reduced even this list nearly to the vanishing point. Only 32, or 18.8%, of the total eyes examined could be regarded as free from ametropia, manifest even to the incomplete investigation.

So, too, the refraction work in our clinics gives a showing of the ametropia that can be robbed of little of its force by the claim that eye patients do not fairly represent the general population. One-third of the work done at the Wills Eye Hospital in Philadelphia among its 10,000 annual patients, is the correction of refraction errors; and the proportion is nearly one-half in the Eye Clinic of the University of Pennsylvania. Let it be shown by competent investigation that any large group of adults presents a considerable proportion of emmetropia, and then only will such facts as these be at all in need of confirmation. If we look at any group of people whose refraction has been measured in order to seek the relation of refraction error to other disease—be it chorea, epilepsy, glaucoma or anything else—we find results that vary only with the method and care of the examiner. Dr. de Schweinitz found, as did Stevens, a high proportion of ametropia among choreic children, but not more than Risley found in 1,200 of the general school population of Philadelphia. In the latter investigation the emmetropes remained practically unvarying in the ages from 6 to 21 years. The study of adults reaches parallel results.

Those who would uphold the assumption of the prevalence of emmetropia must fall back upon a series of unproven and

⁴Randall, "Eyes of Medical Students," *Trans. Pennsylvania State Med. Soc.* 1885.

really untenable explanations of why the facts conflict with their theory. They must exclude all low grades of error as unimportant and physiologically normal—a point which experience in correcting small errors fully disproves. Small grades of ametropia are quite as often the cause of asthenopia as the larger ones; and while far from asserting that the weak glasses of my test case are the most important, I must needs recognize that this neglect of the low grades of refraction error is one of the few points in which Donders' great treatise has been found imperfect. One stronghold remains, but it is difficult to see how anything but blind prejudice can deem it impregnable. It is claimed by some that mydriatics give us a false view of the refractive condition of the eye, that paralysis of the accomodation is accompanied by a fictitious decrease of the refraction, and that the measurements so obtained must be "*discounted*" in order to arrive at the true *static refraction* or condition of entire rest. Merely negative evidence can be adduced in support of this view, and abundant positive evidence to the contrary is readily accessible. The oft-quoted statement of Donders is cited, that 'a tone of accommodation' to the extent of .37 to .90D. is usual and can be relaxed only by accommodative paralysis—a view from which he did not publicly recede, so far as I know. Yet he wrote to me as to this in 1885: "The difference is slighter than I had supposed and may be neglected for the myopic eye. Another question is whether it depends on the tone of accommodation, which can only be supposed (as existing generally in not-striped muscular tissue), but not proved."

The resting points for this view are the facts that a mydriatic often shows a lower myopia or a higher hypermetropia than is discoverable before or after its use, and that most people complain of blurred distant vision if the full mydriatic correction is given.⁵ Most persons certainly do *at first*, or at least most hypermetropes; but it is exceedingly pertinent to ask

⁵As Dr. Jackson has pointed out, full correction for 5 metres is really 0.2 D. over-correction for distance, a point usually forgotten.

why *all* do not, and why myopes are rarely much troubled in this regard. The answer is really self-evident—the myope has generally established no habitual accommodative tension; if it is present in any case, every one recognizes it as an “accommodative cramp,” not a “tone.” The hypermetrope, on the other hand, has so long maintained his accommodation tense, even in distant vision, that he finds it hard to unlearn the habit when it becomes no longer necessary. What ophthalmoscopist ever found it easy at once to relax all accommodative effort, or even after he has learned to relax, finds it always possible to do so? An eye whose accommodation has long been cramped is apt to return to its cramp when the mydriatic wears off, and will therefore see imperfectly at a distance with the totally correcting glass. If such a difficulty lasts more than a fortnight, as it will in a very few cases, it is almost invariably because of muscular insufficiency which has not been corrected. The essential question here to be considered is whether the mydriatic, pushed to total paralysis of the accommodation, invariably gives an untrue picture of the refraction and causes an artificial hypermetropia, as has been claimed. From two points of view this claim can be distinctly disproved. First the cases are not very rare in which full mydriatic paralysis gives identically the same result as was obtained with active accommodation; and secondly, a large number of cases can be taught fully to relax their accommodation and obtain full vision with a glass totally correcting the defect revealed under the mydriatic. The length of the time and the amount of annoying blurring before this is gained vary in different cases, and the question must always present itself to the practitioner, whether the benefits may not be fully gained and the discomfort lessened by giving an under-correcting glass. But this is a question of expediency, not of necessity; and those who habitually give total corrections and insist upon their constant wear, fail in few cases to obtain the desired result.

In the appended table of cases will be found, first, a group where the refraction was unchanged by the mydriatic; second,

those who obtained full vision with totally correcting glasses; and third, a series to show how far astray the manifest error was from the true refraction. Of the first class of these cases, where the refraction was the same before and with the mydriatic, I have few accessible records, and I cannot, like Roosa, cite 6 eyes out of 20 which remained absolutely emmetropic under atropine. Yet every one who has put this matter to a fair test has met such cases, not only in middle life, but even in childhood. In the school examinations, Cohn reports 34 cases whose manifest hypermetropia was absolutely unchanged by total atropine mydriasis; and Dürr obtained like results under homatropine. Such cases, if not common, are not the less emphatic in their teaching. Of those who have received totally correcting glasses and with them have obtained full vision, dozens might be cited, although I have not tested and recorded the ultimate vision in even one-half of those who ceased to complain of blurring for distance, and have chosen only hypermetropes here as illustrations. Of the third group only a few are brought forward, because no one who has ever used a mydriatic can doubt that, in a large proportion of cases, the true result cannot possibly be obtained without it. These are all recent cases from my private record.

And here let me say as to my refraction work, that it is all done under conditions practically identical, with good uniform illumination on the test card, that the mistake of even a single letter in a long line has been signified by a question mark, that the minutest errors and discrepancies have been noted, and that full mydriatic paralysis has not been assumed merely because a mydriatic had been several times instilled, but proven by careful tests both for distance and for near. In the latter case an artificial far-point of 25 cm. has been generally used, and as the test object the finest of type or Burchardt's dots.

While a mydriatic has been habitually employed, it has been always regarded as a disagreeable measure which should be avoided if possible; and accordingly, among the last 250 cases on my record, I find that there were 175 of refraction error (exclusive of presbyopia), and in 101 of these a mydriatic was

used. Of the remainder, there were 53 patients less than 45 years of age to whom no mydriatic was given. This was not always from choice, for there were some of these cases where the mydriatic was advised, and the manifest glass was given only tentatively and under protest. There were also a few cases where I refused to give a glass without full use of a mydriatic, and thereby lost the patient: but these have not been included here. The method of employment has depended upon the mydriatic and the case. With *hyoscyamiæ sulphate*, which I much prefer, a 2-grain solution has been prescribed, to be instilled one drop in each eye at bedtime and again on rising, with perhaps another instillation before the measurement. Dark coquilles or a thick veil have been worn to shade the eyes from glare, and the examination generally repeated, with continued instillation, on several days. Retinoscopy with the plane mirror at 4 metres distance, and the ophthalmoscope, have been used as control tests—the former being specially valuable, since with it discrepancies of .25 D. or 5° in cylinder axis can hardly be overlooked.

As a mydriatic, *hyoscyamine* is probably unequalled. Chemically identical with *duboisine*, it yet seems distinctly less inclined to exert the toxic action which too often made the latter drug a treacherous ally; and in a strength of 2 grs. to the ounce it rarely causes any constitutional symptoms. Its action is more prompt and energetic than that of *atropia* in stronger solutions, and its full action is obtained in about half an hour. Even after a single instillation there is little or no diminution in its effect for about seventy hours, while the troublesome period of returning accommodation is only about two days. Recovery from its effect is as complete in five days as on the tenth day after the use of the *atropia*, although the grasp of the latter drug begins to waver much earlier, while the *hyoscyamine* is still in full control. A week can generally be set, therefore, as the time during which near work must be abandoned on its account, while the similar period for *atropia* is quite two weeks. This is a strong point in its favor, since it is quite trouble enough to disable the patient for the shorter

period; but its highest value lies in the unvarying grasp upon the accommodation for about three days after the last instillation, so that the rest which it enforces is generally absolute. As this "putting the accommodation in splints" is one of the special indications for the use of a mydriatic, and one in which the atropia gives at most two days of rest, the superiority of the shorter-lived mydriatic is manifest. No value of this sort attaches to the use of homatropine; but in eyes that are not very irritable, total paralysis can be obtained by several instillations of a 6 gr. solution, and it has much value in its narrow field.

When, with or without a mydriatic, a glass is found which gives the best attainable vision and is confirmed by the retinoscopy and ophthalmoscope, there is room for judgment as to whether it shall be ordered as it stands or be modified to meet some special indication of the case; but there is in few cases anything but disadvantage in waiting until the mydriasis has wholly disappeared before ordering the glass. The accommodation and muscular condition should be determined at the first examination, and furnish, with the history, the only data which legitimately influence the decision as to the glass to be given. Upon one general rule I should like to insist, because it would seem to be followed by few, and that is that the total correction should be given unmodified, except for clear and definite cause. It is not always wise to give full correction to myopes; but I am persuaded that if our European colleagues would do more of it, with careful correction of astigmatism, they would see far less progressive myopia. As has been said, it is sometimes very difficult to get a hypermetrope to accept the total mydriatic correction; and, in the absence of strabismus or asthenopia, policy may dictate a reduction of the convex spherical by .25 or .5 D. Insufficiency of convergence, especially for distance, generally makes the use of the total correcting glass impossible unless it is combined with a prismatic correction. This latter can often be most satisfactorily obtained by modification of the centering of the lenses. Inattention by oculists and opticians to this matter of precise

centering is a prolific source of unsatisfactory results, which very little care could wholly avoid; and the oculist should specify the exact distance between the optical centres, and make a point of verifying the strength and fit of every glass he orders, if possible.

While there is little in the foregoing that can make the least claim to novelty, since most of it has been previously and better said, it contains much, I believe, which is at present accepted and applied in practice by only too small a minority. I beg leave, therefore, in closing, to reiterate the following points and to urge their importance upon all who are doing ophthalmological work:

1. Errors of refraction are present in the great majority of cases, but need correction in only a portion of those who suffer with eye-trouble.
2. In all correction of refraction errors, the manifest refraction is as uncertain a basis as a quicksand, and the *static* refraction is the only true basis on which to work.
3. A mydriatic is often required in order to give the eye a needed rest and to measure correctly the refraction, and it must be used to the extent of total ciliary paralysis to meet this end, as a small remnant of accommodation is sufficient to mask astigmatism as well as hypermetropia.
4. The glass as determined under full mydriatic paralysis measures the true static refraction of the eye.
5. The glass given should accord with the static refraction of the eye, being modified only for good and definite cause.
6. The minutest accuracy is desirable as to the strength and fitness of the glasses, and the width of the optical centres should be exactly prescribed.
7. The balance of the ocular muscles should be strictly studied in every case, since these relations have important bearings upon the ordering of lenses.
8. If these matters have been properly studied when the case is first seen, there is rarely any need of delaying the ordering of the glasses until the accommodation has returned.

CASES ILLUSTRATING REFRACTION UNCHANGED BY FULL MYDRIASIS.

1. Miss Kate S., æt. 24; Right Eye $V = \frac{6}{6} +$, no astigmatic lines chosen, near-point for $D = .50$, 13 cm., with $+.75$ spherical $V = \frac{6}{6} +$; under homatropine with $+.90$ or $.75$ sph. $V = \frac{6}{6}$; Left Eye $V = \frac{6}{6} +$, with $+.65$ cylinder axis 180° $V = \frac{6}{6} +$, under hom. with $+.65$ cyl. axis $180^\circ \frac{6}{6}$.

2. Miss Mary W., æt. 24; R. E. $\frac{6}{6}$, with $-.10$ sph. $\frac{6}{12} +$, no lines chosen; under hyoscyamine $-.10$ (with or without $-.50$ cyl. axis 150°) $\frac{6}{7.5} ?$; L. E. $\frac{6}{6}$, $-.10$ sph. $\frac{6}{12} +$; under the mydriatic $-.10$ s. (\bigcirc $-.50$ cyl. axis $150^\circ ?$) $\frac{6}{7} ?$. Without glass $D = .50$, 5 to 10 cm. each.

3. George B., æt. 16, R. E. $\frac{6}{50}$, no lines $D = .50$ read from 8 to .25 cm., with $-.325$ sph. $\frac{6}{6}$; under homatropine with $-.325$ $\frac{6}{6}$. L. E. $\frac{6}{50}$, no lines, same accom., with $-.4$ sph. $\frac{6}{6}$; under homatropine, $-.4$ sph. (or $-.35$ s. \bigcirc $-.50$ c. axis $180^\circ ?$) $\frac{6}{6}$.

CASES ILLUSTRATING FULL VISION THROUGH THE TOTALLY CORRECTING LENS.

1. John W., æt. 10; Right Eye $V = \frac{6}{19}$, lines chosen at 180° , near-point 11 cm. for $D = .50$, eye hypermetropic but vision made worse by any convex glass; under hyoscyamine with $+.25$ sph. $\bigcirc + .90$ cyl. axis $90^\circ \frac{6}{15}$. The left eye gave an identical result, before and after the mydriatic. Six months later he came with the glasses broken and claiming to see better without them; but saw $\frac{6}{15}$ and $\frac{6}{19}$ without, and $\frac{6}{12}$ each with them. A few months later his vision had risen to $\frac{6}{7.5} ?$ each through the glass, and accom. was normal.

2. Robert L., æt. 17, R. E. $\frac{6}{6}$, lines at 180° , near-point 10 cm., with $+.1$ s. $\bigcirc + .37$ c. axis $90^\circ \frac{6}{6} +$; L. E. same vision and accom., with $+.90$ s. $\bigcirc + .37$ c. axis $90^\circ \frac{6}{6} +$. Hyoscyamine showed R $+.125$ s. $\bigcirc + .25$ c. $90^\circ \frac{6}{6}$, and L. $+.125$ s. $\bigcirc + .37$ c. $90^\circ \frac{6}{6}$; and the result has remained unchanged since, although a low grade of exophoria is present.

3. Richard S., æt. 33, R. E. $\frac{6}{7.5}$, lines 170° , near-point 22 cm., with $-.50$ cyl. $.80^\circ \frac{6}{6}$; under hyosc. $+.65$ c. 180° gave $\frac{6}{7.5}$, which became later $\frac{6}{6} ?$; L. E. $\frac{6}{9} ? +$, with $-.50$ c. $100^\circ \frac{6}{6}$; under mydriatic $+.25$ s. $\bigcirc .50$ c. 150° gave $\frac{6}{7.5}$, later $\frac{6}{6} ?$.

4. Flora J., æt. 13; R. E. $\frac{6}{6}$, no lines, near-point 11 cm., H. m. $+.65$ s. $\frac{6}{6}$; under hyosc. $+.75$ s. $\bigcirc + .65$ c. 90° gave $\frac{6}{6}$; L. E. $\frac{6}{40}$, no lines, $D = 1.50$ read at 17 cm. $+.2$ s. $\bigcirc + .25$ c. $90^\circ \frac{6}{30} ?$; under hyosc. $+.2$ s. $\bigcirc + .3$ c. 90° gave $\frac{6}{12} ? +$. A month later the vision was still $\frac{6}{6} +$ on the right and $\frac{6}{12} ? +$ on the left.

5. Sadie D., æt. 26; R. E. $\frac{6}{7.5} ?$, lines 180° , near-point 15 cm., with $+.25$ s. $\bigcirc + .64$ c. $90^\circ \frac{6}{6} ?$; under hyosc. $+.325$ s. $\bigcirc + .50$ c. $90^\circ \frac{6}{6} ?$; L. E. $\frac{6}{7.5} ?$, same lines and near-point, with $+.25$ s. $\bigcirc + .25$ c. $90^\circ \frac{6}{6} ?$, under hyosc. $+.325$ s. $\bigcirc .50$ c. $90^\circ \frac{6}{6}$. As this seemed a slight over-correction $+.3$ s. $\bigcirc + .50$ c. 90° was given, and with it three months later each eye saw $\frac{6}{4} ?$ Agnew had given sphericals $+.275$ and $.25$ several years previously.

6. Miss M., æt. 23, R. E. $\frac{6}{7.5} ?$, no lines, near-point 22 cm., H. m. $+.90$ s. $\frac{6}{7.5} ?$; under hyosc. $+.15$ s. $\bigcirc + .37$ c. $90^\circ \frac{6}{7.5} ?$; L. E. $\frac{6}{9} ?$, no lines, same accom., with $+.90$ s. $\frac{6}{9} ?$; under the mydriatic with $+.15$ s. $\bigcirc + .37$ c. $90^\circ \frac{6}{7.5} ? +$. She was still able to read many of $\frac{6}{6}$ with each eye when seen after the mydriatic had disappeared, and has remained comfortable with constant wear of her glass.

7. Mrs. L., æt. 34, R. E. $\frac{6}{6}$?, no lines, H m. + .25, same vision; under hyosc. with + .25 c. $90^\circ \frac{6}{6}$?; later $\frac{6}{6}$ full: L. E. $\frac{6}{6}$, lines 15° , with + .35 c. axis $105^\circ \frac{6}{12}$; under mydriatic + .5 s. \bigcirc + .45 c. axis $100^\circ \frac{6}{12}$; same vision after return of accom.

8. Mrs. W., æt. 44, R. E. $\frac{6}{24}$, lines, 150° , with + 1. s. \bigcirc + .50 c. axis $60^\circ \frac{6}{12}$?; under hyosc. with + 1.5 s. $\frac{6}{6}$?, later $\frac{6}{6}$: L. E. $\frac{6}{50}$, lines at 30° , with + 1.25 s. \bigcirc + .50 c. axis $120^\circ \frac{6}{12}$?; under hyosc. with + 1.75 s. \bigcirc + .65 c. axis $90^\circ \frac{6}{7.5}$ +; later $\frac{6}{6}$?.

9. Mrs. H., æt. 30, R. E. $\frac{6}{30}$?, improved by no glass, lines 165° , read D = .5 at 15 cm.; under hyosc. with + .25 s. \bigcirc + 1.5 c. axis $90^\circ \frac{6}{15}$? +, later $\frac{6}{15}$?: L. E. $\frac{6}{12}$, lines 90° , D = .5 from 30 to 45 cm., with + 2. s. $\frac{6}{12}$; under hyosc. with + 3.5 s. $\frac{6}{9}$, later $\frac{6}{9}$ +. The lowered vision was due to hazy and irregular corneæ, worse on the right.

10. Mary C., æt. 16, R. E. $\frac{6}{9}$, no lines, near-point 32 cm., with + .65 s. $\frac{6}{7.5}$; under hyosc. with + 1. s. \bigcirc + .50 c. axis $80^\circ \frac{6}{6}$; L. E. $\frac{6}{9}$, no lines, same near-point with + .90 s. $\frac{6}{7.5}$; under mydriatic with + .9 s. \bigcirc + .65 c. axis $100^\circ \frac{6}{7.5}$ +. As these seemed slightly over-correcting, + .75 s. was given in combination with the cylinder for each eye; and when last seen the right had V = $\frac{6}{6}$?, left $\frac{6}{6}$ full.

CASES ILLUSTRATING MARKED DIFFERENCES BETWEEN THE MANIFEST AND TRUE REFRACTION.

1. Mrs. C., æt. 38, R. E. $\frac{6}{19}$? +, lines chosen at 105° , near-point indeterminate with — 2. c. axis $80^\circ \frac{6}{12}$? +; under hyoscamine with + 2.25 c. axis $120^\circ \frac{6}{7.5}$? +; L. E. $\frac{6}{15}$? +, lines at 105° near-point 18 cm. for D = .5, with — 2. c. axis $165^\circ \frac{6}{12}$?; under hyosc. with + 2. c. axis $80^\circ \frac{6}{7.5}$? +.

2. Lizzie K., æt. 23, R. E. $\frac{6}{50}$, lines at 120° , large print spelled with difficulty, with — 3. s. \bigcirc — 2.5 c. axis $35^\circ \frac{6}{20}$?; under hyoscine with — 1. s. \bigcirc — 4.5 c. axis $45^\circ \frac{6}{7.5}$? +; L. E. $\frac{6}{60}$, lines at 60° , large print at 10 cm., with — 4 s. \bigcirc — 2.5 c. axis $150^\circ \frac{6}{15}$? +. These seemed accurate, but the cylinders alone were ordered; and with them she had a month later $\frac{6}{12}$? each. Three years later she returned with $\frac{6}{12}$, most of $\frac{6}{9}$, on the right and $\frac{6}{15}$ on the left, with these glasses. Her glasses had been frequently strengthened before coming to me, and she was wearing — 6.5 sphericals given by an optician "professor."

3. Miss M., æt. 34, R. E. $\frac{6}{12}$? +, lines at 105° , large print at 35 cm., with + .65 c. axis $105^\circ \frac{6}{9}$??; under hyoscamine with + 3. s. $\frac{6}{6}$?: L. E. $\frac{6}{6}$?: no lines, near-point 25 cm., all glasses rejected; under hyosc. with + 2. s. $\frac{6}{6}$?. These were given, but worn little except for near work; with them when last seen $\frac{6}{9}$?? right, and $\frac{6}{6}$?? left.

4. Miss Minnie C. æt. 22, R. E. $\frac{6}{19}$, with — .75 c. axis $105^\circ \frac{6}{12}$; under homatr. with + 1. s. \bigcirc + .50 c. axis $20^\circ \frac{6}{9}$ +: L. E. $\frac{6}{12}$, with — .25 c. axis $75^\circ \frac{6}{12}$ +; under hom. with + 1. s. \bigcirc + .75 c. axis $160^\circ \frac{6}{9}$ +. Some exophoria, and she had worn concave glasses.

5. Mrs. G. R., æt. 22, R. E. $\frac{6}{60}$, lines at 75° , chose — 3. s. \bigcirc — 2. c. axis 165° ; under hyosc. with — .75 s. \bigcirc — 3.5 c. axis $170^\circ \frac{6}{12}$: L. E. $\frac{6}{19}$, lines at 100° , chose — 1. s. \bigcirc — 1.5 c. axis 10° ; under hyosc. with — 2.75 c. axis $10^\circ \frac{6}{9}$?. With these the vision was slightly better when last seen.—*Journal American Medical Association.*

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ORIGINAL ARTICLES.

TRAUMATIC HÆMORRHAGES IN THE REGION
OF THE MACULA LUTEA.

BY S. C. AYRES, M.D., OF CINCINNATI, OHIO.

The importance of preserving central vision makes all injuries involving the macula region assume a serious aspect until the blood has cleared up sufficiently to allow an inspection by the ophthalmoscope. The following cases are reported to show how rapidly and completely eyes, otherwise healthy, recover from apparently severe injuries involving the yellow spot and its immediate vicinity.

The anatomical construction of the macula lutea is such, that we might reasonably expect it to suffer from contusions and injuries of the eye-ball more than other portions of the retina. Stricker says "the fragile and transitory nature of the substance of the yellow spot is explained by the circumstance that the more delicate nervous elements here greatly outnumber the elements of the connective substance, which in other portions of the retina occupy a much more considerable space." The macula being surrounded by delicate capillary

loops, seems to offer a point of less resistance than other portions of the retina.

Intra-ocular haemorrhages occur quite frequently from injuries and contusions of the eye-ball. After the vitreous has cleared up, it is not always possible to tell the point at which the haemorrhage occurred. It might have been from the anterior portion of the eye-ball; from the ciliary region; in which case it would be impossible to locate the lesion. If from the posterior portion of the globe, the point of haemorrhage can frequently be located if the eye is examined before the blood is entirely absorbed. In an otherwise healthy eye, traumatic intra-ocular haemorrhages are absorbed very rapidly. Haemorrhages in the vicinity of the macula lutea are very liable to be followed by impairment of vision. Central vision may be entirely destroyed, or a condition of permanent metamorphopsia may remain.

CASE I.—INJURY OF THE EYE BY A BALL.

Intra-Ocular Haemorrhage and Haemorrhage in Macula Lutea; Metamorphopsia; Changes in Refraction of the Eye; Recovery.

C., gave the following history of an accident which he received five days ago:

He was playing base ball and was struck by the ball in the left eye. There was immediate loss of vision, and the eye was considerably painful for the rest of the day. Cold applications were applied, and two days later, he began to see light. The following day he could dimly see large objects in the room.

I saw him on the fifth day after the injury, on May 24, 1888, and by that time he was able to count fingers at 4 feet. The pupil was dilated almost ad maximum and fixed, and presented an elongated appearance. He was required to keep quietly at home in a darkened room, and a weak solution of eserine was used twice a day. There was a haemorrhage in the region of the macula lutea, somewhat irregular in shape, but distinctly involving that region. May 20, V=0.3.

Blood absorbing; he has now metamorphopsia in the horizontal meridian. Horizontal lines appear broken and irregular in the center. The case progressed very favorably, and by June 4, vision had increased to 0.7. He now appeared slightly myopic, and with -0.75 , his vision was 0.9. The pupil still remains dilated but not so much as at first.

June 19, V=0.9. Sees better with -0.75 D. cyl. ax., 0° .

July 6, V=0.9, with $+0.25$ D. cyl. ax., 90° , V=1. Vertical lines wavy; horizontal correct.

July 23, V=1.

September 7, his refraction was tested under homatropine with the result of discovering that he had hyperopic astigmatism in a moderate degree in both eyes.

CASE II.—INJURY OF THE EYE BY A RUBBER SLING SHOT.

Extensive Intra-Ocular Hæmorrhage and Hæmorrhage in Region of Macula Lutea With Cœdema of Retina; Recovery.

G. B., æt. 15. On March 6, 1889, he was hit in the eye with a shot thrown from a rubber sling, which struck the eye-ball just below the cornea. The blow was followed by almost instant loss of sight; this continued for two days, when it began to clear up. The vision slightly improved, so that in the course of three or four days he could see objects around the room.

I saw him first, ten days after the injury; at that time vision was 0.4. There was no external evidence of an injury; the central portion of the retina around the macula presented a stippled appearance, as if there were minute hæmorrhages collected together; in the macula region there was a little grayish spot which seemed to be slightly prominent; the retina for some distance around the macula was oedematous. Four days later vision was increased to 0.8, and on March 21, vision was 0.9. The stippled appearance around the macula gradually subsided. Later I saw him again and vision was perfectly restored and no trace of the injury could be seen.

CASE III.—HÆMORRHAGE IN THE REGION OF THE MACULA
WHILE STOOPING DOWN TO DRINK OUT OF A STREAM.*Œdema of the Retina; Central Scotoma; Recovery.*

October 25, 1888. E. H. N., æt. 24, gave the following history of the amblyopia of his right eye:

He says that two weeks ago, while hunting, he stooped down to drink out of a stream, and when he arose he noticed some dark clouds before that eye and dimness of vision. This increased during the day, and by evening his sight was so imperfect that he could not count fingers, and could only see motions of the hand far downward. There was no pain and no inconvenience except from loss of vision. This remained nearly the same until the present time. The ophthalmoscope shows marked alterations in the region of the macula. There is a hæmorrhage irregular in shape and a grayish cloud which partly covers it, probably due to œdema of the retina.

He remained under treatment for a short time, and when he left his vision had increased to 0.1, but the scotoma still involved the inner and central portion of his field of vision. He went home under strict instructions and returned in a month, and vision had improved to 0.6. He was seen February 7, 1889, about four months after the injury, and vision in this eye was perfect.

The field of vision was complete, but he says there is the thinnest possible scotoma which can still be detected in the central portion of the field; it does not, however, interfere with his acuity of vision.

In the first case there was a well-marked mydriasis with a fixed condition of the pupil, and later on some interesting changes in the refraction. First he saw better with a concave lens, then with a concave cylinder, later with a convex cylinder, and when his refraction was tested he was found to have hyperopic astigmatism.

Berlin in speaking of the eye says "that it is very probable that hæmorrhages in the immediate vicinity of the lens can in-

fluence the shape, and even, under certain circumstances, the position of the latter, and thus cause a disturbance of vision in conjunction with the spastic contraction of the sphincter iridis through irregular astigmatism. In this case the concussion of the heavy ball coming with considerable velocity would very probably cause haemorrhages in the anterior portion of the eye. It was probably in the ciliary region and in sufficient quantity to influence the action of the ciliary muscle on the lens and especially when associated with mydriasis."

In the proceedings of the Ophthalmological Society of the United Kingdom, March, 1888, Mr. Lang reported a case of Retinal Haemorrhage in the region of the yellow spot. It recovered with perfect vision and in his judgment the haemorrhage occurred between the hyaloid membrane of the vitreous and the retina, and not between the layers of the retina or in the choroid.

At the same meeting "Mr. Nettleship showed diagrams of two cases of large semi-circular haemorrhages at the yellow spot; the inferior macular artery which traversed the blood patch was found to be obliterated in one case, and greatly altered in the other." This condition offered very plausible explanation of the haemorrhage and showed that it was from a retinal vessel. It seemed also more probable that complete recovery might take place when the haemorrhage was from the retina and immediately underneath the hyaloid, than where it was from the choroid. If from the latter it would probably cause such an amount of cicatrization in the chorio-capillaris as to influence the rods and cones, and result in a limited scotoma or in permanent metamorphopsia.

In the second case there was an oedematous condition of the retina which extended for some distance around the macula, but it all disappeared, and there was no visible trace of the injury left.

Berlin says he has observed the retina to assume a gray cloudy opacity in a defined area after injuries of the eye with a blunt body.

Arlt, in his work on injuries of the eye, says that experiments

on rabbits proved that blows on the sclerotic caused an opacity in the immediate vicinity of the injuries and also at a point nearly corresponding on the opposite side of the eye. He says that this œdema of the retina is due to hæmorrhages between the choroid and the sclerotic.

In the third case the hæmorrhage was not strictly traumatic. He had become heated while walking, and stooped down to drink. It was not apoplectic in the general acceptation of the term, as it was not due to a disease of the coats of the blood vessels. It was traumatic in the sense that the retinal vessels were engorged and the return of their blood to the heart impeded by his constrained and unnatural position.

Here also there was œdema of the retina as in the previous case. There was a central scotoma, and vision was long returning. It is probable that there was a hæmorrhage not only between the retina and the hyaloid membrane of the vitreous, but into the substance of the retina itself.

TWO CASES OF PERFORATING INJURY TO THE SCLEROTIC, CHOROID AND RETINA, ALMOST IDENTICAL.

BY ADOLF ALT, M.D., ST. LOUIS.

On September 29, 1890, I was consulted by J. M., æt. 30, a railroad laborer, on account of an injury to the right eye.

He stated, that the previous afternoon, while "chipping," he was struck by a piece of steel about "one-half of an inch long." He felt a severe pain and had to give up working on account of loss of sight. When I saw him there was some episcleral injection, the pupil was somewhat contracted, and there was slight photophobia. Outward and downward, just behind the ciliary region, there was a clear cut in the sclerotic which was about one-quarter of an inch long. On slight pressure it gaped, and a small amount of clear vitreous body became visible. This of course established the fact, that the injuring steel had cut through sclerotic, choroid and retina. The pupil dilated readily on the instillation of atropine. He counted fingers at 9 feet.

With the ophthalmoscope hyperæmia of the papilla and retina (veins tortuous) was plainly visible. Corresponding to the external wound a small opening in the retina was found, with a number of very small haemorrhages surrounding it. The vitreous body was clear. No foreign body could be detected, in spite of a prolonged and exhaustive search.

The eye was thoroughly stained with pyoktanine (1:1500) and hermetically sealed. A guarded prognosis was given.

The next day no further inflammatory reaction could be

found, and the wound-lips did not gape as much. This I took as a good omen; but the next day signs of iritis showed themselves, and a few days after there was also hypopyon. These symptoms developed in spite of antiseptic treatment and dilatation of the pupil. The patient now suffered from severe pain, headache, giddiness, and $V=1/\infty$.

At the height of the inflammation the patient disappeared.

On January 3, 1891, he returned, telling a story of severe illness with brain-symptoms, from which he was just recovering. His eye was now free from irritation. The wound was well healed. The iris was nowhere adherent to the lens, and the pupil was active. $V=1/\infty$ excentrically. Almost total detachment of the retina.

On October 15, 1890, while J. M. was yet under observation, E. M. consulted me. He was also a railroad laborer, 20 years old, and had also been struck by a piece of steel, while chipping, the day before. In his case it was the left eye that was injured. Vision was reduced to $12/200$. On examination, I found the identical injury of the previous case, reproduced here, only in the other eye, *viz.*, a clean cut, about a quarter of an inch long, just behind the ciliary region, outward and downward in its direction. It gaped easily on pressure, and a clear bead of vitreous showed itself. The only difference this case presented was, that the inner wound more nearly equalled the outer one in size, than in the former case.

There was also hyperæmia of disc and retina, and a gaping opening in the retina and choroid, which had both retracted and left a black centre (vitreous) with a whitish yellow border (sclerotic) easily seen with the ophthalmoscope. The retina surrounding the opening was infiltrated with blood for some distance.

The treatment consisted of pyoktanine-staining, dilatation of the pupil and closure of the lids.

The healing was uninterrupted by any inflammatory sign, and allowed of a daily ophthalmoscopic study of the healing process. The latter was ended 17 days after the injury had

been received. The scar was then firm, $V=^{20}/_{xx}$, and the patient was discharged.

It was certainly interesting to see two cases of a comparatively rare nature come so closely together, and, being so nearly alike, yet end so differently. Of course, in the one case infection of the deeper parts had taken place, while in the second one such an accident had luckily not occurred.

SELECTIONS FROM AMERICAN MEDICAL JOURNALS.

PROPHYLAXIS OF OPHTHALMIA NEONATORUM.¹

BY ROBERT TILLEY, M.D., CHICAGO.

In 1876 a German congress of the teachers of the blind, assembled in Dresden, devoted its attention to the subject of ophthalmia neonatorum, and realized how important a factor it was in the cause of blindness. The result of this convention was that the study of this question was recommended to the special attention of all persons who could contribute to its correction. From this time the study of the best means of prophylaxis of ophthalmia of the new-born occupied the attention of industrious, capable and philanthropic men. When we reflect that this disease contributed as many as forty per cent of the inmates of some of the institutions for the blind we only wonder that the subject had not previously called forth the spirit of practical investigation. It would be the most flagrant waste of time were I to stop to talk to members of this society of the privation and distress associated with a life-long blindness, or of the necessity of watching any possible source of contribution to such an affliction. No arguments on this subject can possibly be necessary. To a certain extent our honor as medical men is associated with the question of the relative number of blind in the community, and I believe that in proportion as we duly understand and appreciate the importance of this subject in its various relations, the propor-

¹Read before the Chicago Medical Society.

tion of blind from this source will diminish until blindness from this source will be practically unknown.

I said that 40% of some of the inmates of certain blind institutions were the victims of uncured ophthalmia neonatorum, but it must not be inferred that 40% of all the blind are blind from this cause. It is of course almost impossible to obtain exact figures on this question; but from a very careful computation made by very competent men on 2528 blind individuals, it appears that about 10% of all the blind are blind from this cause. These statistics were obtained from the observations of men of unquestionable ability and honesty, and whilst different countries must necessarily suffer in different degrees from an affection of such a kind, we may without exaggeration accept 10% of all blind persons up to the year 1870 as being blind from ophthalmia neonatorum.

When this subject was brought prominently before the profession, many men, whose names it is not necessary to mention, devoted their attention to the development of the necessary measures to remedy the evil. By some the chief care and attention was directed to the irrigation and disinfection of the vaginal canal immediately preceding the act of birth, and by these means the former percentage of babies afflicted with the disease was by different individuals variously diminished; but even with the best of care there remained in the institutions where the observations were made 2.5 or 2% afflicted with ophthalmia neonatorum, when the efforts of the observers were confined to antiseptic washings of the vaginal canal and the ordinary care in cleansing of the babe's eyes. Credé, of Leipsic, however, directed his attention not to the vaginal canal, but to the eyes of the infants, and by his attention the affection is said to have practically disappeared from the institution. According to statistics of the Leipsic Lying-in Institute in the year 1874, the percentage of infants which suffered from ophthalmia neonatorum was 13.6%; in the first half of 1880 the number was by greater attention to cleanliness reduced to 7.6%, and from that period the disease practically

disappeared by the adoption of Credé's method of prophylaxis.

Credé's method is as follows: As soon as the cord is tied, the child washed and the eyes cleansed with clean cloths and plain water, each eye is slightly opened and, by means of a glass rod, a single drop of a 2% solution of nitrate of silver is dropped into it. No further care is necessary. Credé assures us that no child so treated showed any signs of ophthalmia neonatorum within seven days after birth, not even in the slightest degree. No disadvantage followed its use; only in a premature babe was there some serous swelling, with some secretion, but which disappeared completely in 48 hours. The lying-in institution in Leipsic affords sufficient cases for generalization—averaging in round numbers about one birth a day.

These are brilliant results, and, according to journal reports, the claims have been sustained by other observers in different countries with practically corresponding results. When on my way to the Berlin congress I determined to try and ascertain in a very general way to what extent the practice was adopted in some of the lying-in institutions: In New York, to the Maternity Hospital I failed to gain admission. I was permitted to see the penitentiary and the general hospital on Blackwell's Island, but I was not admitted to the maternity department. In the Rotunda Hospital in Dublin I was received with the greatest courtesy. I learned that when the publication of Credé was first made the method was there adopted, but on account of a certain amount of irritation and from the fact that the history of the hospital showed a relatively small amount of ophthalmia neonatorum, the process was abandoned. In Paris I visited the Clinique des Accouchements for the same purpose, and there, also, I was received with all the courtesy that any one could wish. There the method of Credé had been adopted, but, after a trial, the solution was reduced to 1%. It was found that irritation occurred in too many cases. At that time a 1% solution was used, but that ophthalmia neonatorum had not disappeared was clear, because I was shown four cases then present, all of

which were well cared for and clearly on the way to complete recovery. In Germany, strange to say, the subject escaped my memory. In an organization in Liverpool which sends out qualified midwives to attend the poor, the plan had never been adopted. I know nothing of the practice in Chicago beyond the limits of St. Luke's Hospital. Credé's method has never been adopted there. The custom with the nurses is immediately after the cord is tied to cleanse the babe's eyes and the contagious parts with clean cloths and water as the first part of the general bath, and in no case to neglect the eyes in case the general bath should for any reason be dispensed with for a time. They are requested never to use on the eyes the cloths which have been used on the body in general. They are also instructed to report promptly any undue photophobia and any redness or swelling. No remedial measures are adopted unless positive indications of disease are manifest.

I have been told that some teachers in Chicago advocate the universal use of the nitrate of silver solution as adopted by Credé in the hospital. This, however, I know only from reports. I shall be glad to hear from others what the practice is.

But whatever the practice of others may be, whether at home or abroad, the only way to practice medicine efficiently is by the vigorous application of reason to our own existing surroundings. The facts which present themselves for our consideration in this study are as follows: In hospital practice it appears that from 5 to 10% of infants are afflicted with ophthalmia neonatorum; that, as a result of this, one in about 11,000 becomes blind; that a certain number, impossible to estimate, are blind in one eye, and others disfigured with a leucomatous condition of the cornea and corresponding defects of sight.

Again, we have this fact to consider—that ophthalmia neonatorum when properly and early taken in hand is very manageable, and rarely results in either loss of vision or deformity. Of course if the cornea is sloughing before it is taken seriously in hand, deformity and defective vision are sure to

follow, but the cornea does not slough until the affection has existed for some time and been neglected.

It is stated that one drop of a 2% solution of nitrate of silver is no disadvantage to those who are not afflicted. This point, however, is not by any means universally conceded and certainly any one who tries it will not ask for its reapplication as a source of pleasure.

Are we then justified in applying promiscuously the nitrate of silver solution to every babe's eyes in order to prevent a possible difficulty from occurring in 5 or 10% of them. In other words, are we to inflict a punishment, however slight, on the infants of 90 or 95% of women who are not afflicted with gonorrhœa in order to save the remaining 10 or 5% from a disease, which, when promptly taken in hand, is very manageable. To this question I should emphatically answer, no, we are not just in adopting such measures. And I do not think it desirable.

The more conservative plan would be to ascertain previous to or at the time of labor if there has been a history of leucorrhœa, and if there has, it would then be desirable to adopt the plan which has proved so eminently successful in Credé's hands. I should consider that in country practice this would be almost the only means which would satisfactorily meet the difficulty. It may be that in this way a few may be subject to the nitrate of silver application, which would have escaped ophthalmia neonatorum, but the probable advantage would more than compensate for the discomforts.

DR. JONAS NEWBERG.—Mr. President. As Dr. Tilley was prevented from investigating the methods of procedure as employed in the Maternity Hospital, and as I was an interne in the Charity Hospital, perhaps I can give some information on this subject. There they used a modified Credé's method, that is, they first washed out the eyes with a 4% solution of boracic acid, and then dropped in a few drops of a 2% solution of nitrate of silver. While I was an interne we had only four or five cases of ophthalmia neonatorum.

We ought to make a sharp dividing line between a gonorrhœal

and non-gonorrhæal affection; and I think in these cases the only way you can do it is by means of a microscope. In those cases where it is gonorrhœal it is a rather severe affection to treat, unless you meet it immediately, and therefore it is decidedly necessary to make a prompt diagnosis. As regards the preventive measures; gonorrhœa in the female attacks principally the cervical mucous membrane and the urethra and the glands of Bartholin and neighboring glands in the vulva; the preventive measures would be to douche with bichloride, or any preferable antiseptic, but this would not reach the cervix and it certainly would not wash out the glands of Bartholin or the urethra. The greatest danger in cases where these parts are affected is, that the secretions are squeezed out when the child's head is on the perineum, therefore the practice in these cases is simply to irrigate this portion. If the cervix is involved I do not think you could by any preventive measure prevent the child getting this affection, because it is almost impossible to cure, or render the gonorrhœa affecting the cervical portion of the uterus non-contagious.

DR. HENRY GRADLE.—Mr. President. I may be able to supplement some of the statements of Dr. Tilley as to German Hospitals. As far as I have been able to follow the matter from reports, none of the German Maternity Hospitals ignore the subject, and the great majority of them follow Crede's method. Some of them have used a corrosive sublimate solution 1-1000, instead of nitrate of silver, and it is generally conceded that this is not a satisfactory substitute, but it is far better to use corrosive sublimate than not to use anything. Dr. Tilley stated that nitrate of silver caused some irritation, which is so, but the irritation seems to be so trivial that it ought not to deter us from using the solution when there is any good reason for applying it. No case has yet been published from any of the hospitals where nitrate of silver did any permanent harm. It is only a matter of a few hours, or at most a few days' swelling of the lids, with scarcely any suffering to the child. Dr. Tilley's suggestions to use it only where there is a clear history of leucorrhœa, might suffer from this disad-

vantage, that gonorrhœal affection in the female does not necessarily lead to a leucorrhœal discharge, while a leucorrhœa is very frequently non-specific. And as we can never be certain whether in a given case there is a remote history of gonorrhœa in either of the parents, it would be perhaps the wiser plan to follow out this method in general practice among the poorer classes, where the disease is much more common, or at least much less treated, and, therefore, more apt to be chronic than in the class of patients who are in a position to take better care of themselves.

DR. BOERNE BETTMAN.—Mr. President. While assistant in Heidelberg, I had an opportunity to treat a great number of these cases, which were sent to our clinic from the Maternity Department. We had also a number of cases of gonorrhœal ophthalmia. The method employed in the hospital was not exactly Credé's method. We simply used a 4% solution of boracic acid, cleansing the eyes with it immediately after birth. I do not think at that time Credé's method was universally adopted in Germany. In the Cook County Hospital I have very few of these cases to treat, and I, the other day, inquired of one of the internes whether they used a preventive method similar to Credé's, and he replied that they did not, but depended entirely upon antiseptic vaginal injections used several hours before the birth of the child. During my service of one year there, I had had only two cases of blenorhœa neonati to treat. I do not know the exact number of births in the hospital, but I should think it was seventy-five or one hundred a year. It is claimed by a number of observers that the gonococcus is found in the majority of eyes affected with this complaint. Oppenheimier, of Heidelberg, made some observations a few years ago, and found the germ in, I think, fully 33%. His observations were made in the hospitals of Germany, and possibly were only among the poorer classes, who come there at the time of labor. I believe the method is a good one, and think it would be well if it were universally employed, because I fully agree with Dr. Gradle that a 2% solution of nitrate of silver in the quantity of a drop is entirely harmless.

DR. C. D. WESCOTT.—Mr. President. I am still in general practice, although I do a little eye work. It has been my custom in obstetric practice among the poorer classes to use the nitrate of silver in the eyes of the new-born babe. I do not do it in all cases, but whenever there is a history of *any* vaginal discharge I personally wash the lids with a little clean water, and then drop in a drop or two of the solution of nitrate of silver in each eye. I have, however, used a weaker solution than the one suggested by Credé. The solution I use is only $\frac{1}{2}$ of 1%, two and a half grains to the ounce. I have not had a case of inflammation of the eyes of a newborn babe that did not yield to simple treatment.

DR. H. M. STARKEY.—Mr. President. A question was asked in regard to the teaching of the school here. I can answer for Prof. Jaggard. He does emphatically recommend the use of Credé's method in each case. I happen to know of some cases where he thought there was no trouble and did not use the method and where trouble has arisen, so he now recommends its use very emphatically, and, I think, also uses the method in Mercy Hospital. I know that I cannot remember in five years of a single case of ophthalmia neonatorum being treated in Mercy Hospital which originated there. Personally, I am coming more to think that it is a wise precaution to use nitrate of silver in all cases, because you occasionally get these cases that turn out so disastrous. I cannot think, as was stated, that these cases are always so easily treated, even when attended to early; that is if by early is meant after one or two days. It seems that if treatment is instituted before inflammation arises the trouble may be prevented. It seems to me that we should make a positive distinction between cases of non-gonorrhœal and gonorrhœal origin; that cases of gonorrhœal origin which have only commenced to have a purulent secretion, only been showing redness for a day or two, with the best means of treatment with which we are acquainted will prove fatal to the eye in quite a large proportion of cases. I do not know that I have treated them less efficiently than others, and yet I know that in a certain number of cases in adults or children, in which

the gonococci are found numerously—hospital cases where they have constant attention and nursing—a large proportion have resulted in sloughing the cornea, and to guard against this it seems to me when there is no decided objection to the use of nitrate of silver, it is better to employ it.

DR. W. F. COLEMAN.—Mr. President. Oculists are sufficiently aware of the dangerous character of ophthalmia neonatorum in certain cases. I have had a very satisfactory experience. The experience is never unsatisfactory unless the cornea has been seriously involved in necrosis; up to that stage it is a manageable disease. The recuperative power of the cornea in the infant is marvelous. I have seen half the cornea slough, and yet the child have sufficient vision to pick up a pin; but notwithstanding this, 10% of the blind are so, we are told, from such ophthalmia. I conclude that with such serious results we ought to adopt any prophylaxis which does not produce harm. I would decidedly advocate the employing of a prophylaxis, but I do not think a 2% solution of Arg. Nit. is absolutely necessary. For the treatment of ophthalmia neonatorum in the severe stage I know of no better remedy than nitrate of silver. Iodoform, mercury, boracic acid and carbolic acid are used. I have tried each of these remedies in one eye and applied nitrate of silver in the other eye, and the silver has the more quickly effected a cure. Now, since a 1% solution of Arg. Nit. can cure a case when the pus is secreting freely, it is of a sufficient strength for prophylaxis. It has been suggested here to apply silver only, as a prophylaxis, but we need not confine ourselves to such an unpleasant remedy. If boracic acid is applied every halfhour for a few days in which there is most danger of attack, and the patient escapes that long, the disease is not at all likely to occur after that. Iodoform may be applied, 10% in vaseline, or perchloride of mercury 1-5000 and these may be applied frequently without any unpleasant result to the infant.

DR. GEORGE WEBSTER.—Mr. President. Although I am not an oculist I have attended a good many cases of obstetrics. I have been called upon to treat a number of cases for this affec-

tion. In the last seven years I have seen from three to six cases a year certainly, I have found that it is well in a large percentage of these cases to apply the nitrate of silver at least once. The secret of the whole matter, as suggested by Dr. Coleman, is that if after the application of the nitrate of silver we get a free discharge we should use a solution daily, of say, 1-6000 of corrosive chloride and have it applied at least every half hour, giving the nurse instruction to thoroughly cleanse the eye every time any pus appears. If this is done there will be no sloughing of the cornea. The eye should be kept absolutely clean night and day, and if that is not done it has been my experience that these cases are not so tractable as we might be led to suppose. I have seen cases where every precaution has been taken yet within two days the eyes would be brimming full of pus, and would fill up again, often in fifteen minutes after they were thoroughly cleansed. If the discharge becomes profuse these solutions must be applied frequently if we wish to save the eyes.

DR. BILLINGS.—Do you use it as a prophylaxis in all cases.

DR. WEBSTER.—Not in all cases, only when I have suspected there might be trouble, but I have never had a case where I used a 2% solution of nitrate of silver and had the nurse keep the eyes thoroughly clean with frequent applications of corrosive chloride, in which any serious consequences resulted.

DR. J. C. HOAG.—Mr. President. I think Dr. Tilley's paper is a very timely one, because I believe that the general practitioner is apt to be rather careless in this matter. If any further statistics were required as to the value of Credé's method, they certainly might be found in the records of the Vienna hospital. I think the statistics there would cover a larger number of cases than those of all the hospitals mentioned by Dr. Tilley. They have from thirty to thirty-five births a day in that hospital, and as I spent a good many months in the clinic there four years ago, I had ample opportunity to observe the application of the method and its results. The internes informed me that since the introduction of the method they had practically excluded this ophthalmia from the hospital. I do not know whether the

strength of the solution they used was 1 or 2%. With regard to the rule we should adopt, it would scarcely seem to me necessary to make a cast-iron rule in ordinary practice. I think if great attention is given to cleansing the eyes at birth, in the case of children who are born of women whom we do not suspect of any inflammatory trouble of the vagina, that it would hardly be necessary to apply the solution in every case, but it would at least be the part of wisdom to do so in all cases where we are at all suspicious of the mother.

DR. ROBERT TILLEY, in closing the discussion said.—Mr. Chairman. I felt like rising to a point of order during part of the discussion, inasmuch as the term gonorrhœal ophthalmia neonatorum was really not the point of the paper at all, and consequently when it was intimated that I claimed that one application of nitrate of silver to eyes that were already affected with ophthalmia neonatorum was all that was necessary, I was absolutely misrepresented. I never gave out any semblance of such an idea. The treatment of ophthalmia neonatorum did not come under consideration at all, but if I had been going to treat that subject there is no question in my mind but that the use of nitrate of silver is incomparably superior to any of the other remedies that have been mentioned.

I would say with reference to bringing forward other statistics that I did not think it necessary. I considered Credé's method complete and satisfactory and that no further evidences were necessary. To me the evidence from the Leipsic institution needs no corroboration whatever, and if it were possible to have it universally adopted, I am satisfied that ophthalmia neonatorum would be practically unknown. I did not intimate, or rather I did not state from my own knowledge, that nitrate of silver causes a certain amount of irritation, with the idea that there was an objection to its use on account of this irritation. I also stated that the irritation disappeared in 48 hours; Credé mentions 24 to 48 hours. With reference to the claim I made that these cases, when seen within a reasonable length of time, are very manageable, my own experience

so far as it has gone would justify me to the last degree in making that statement. I have treated quite a number of cases and have never had any difficulty with a case that I have seen before the cornea has sloughed. Of course when the cornea has sloughed there is no possibility of restoring the eye. When a child is brought to me with the cornea intact, and I have any fair opportunity to treat the child as I feel it is necessary to do, I do not expect any difficulty to arise. We get a number of cases in dispensary practice where the affection has lasted for several days and weeks and sloughing has occurred and then there is no possibility of restoring normal vision.

I would say, Mr. President, with reference to the percentage of nitrate of silver, if we use nitrate of silver at all as a prophylaxis, in my judgement I would adhere most emphatically and strictly to the particular process laid down by Credé. In my opinion he has studied the question thoroughly, and I believe he has settled on a 2% by process of observation. If he has come to the conclusion from his experience that a 2% is the strength desired, I would rather trust to his observation, instituting a possible source of irritation, than to use a $\frac{1}{2}$ or $\frac{1}{4}\%$ with a chance of failure.

Another point is this: The gentleman who was in service at the Maternity Hospital stated that a few drops were used. Credé's method is one single individual drop, and he says it should be dropped from a glass rod, apparently in order to avoid the introduction of more than that. I think that is a wise precaution. I believe that one drop carefully applied as a prophylaxis—not to treat the affection under full sway—would be satisfactory. I remember reading a report made, I think, by Dr. Garrigues, after Credé's paper was published. I had something to do with the *Medical Review* at that time, and had occasion to review Dr. Garrigues' statement, and to some extent criticise it. He gave a very glowing report of the absence of ophthalmia neonatorum, but there was one case in the obstetrical ward that was forgotten, and that was a case of ophthalmia neonatorum in both eyes. The cornea in both

eyes sloughed so that the child was blind. To me that seemed a terrible satire on the treatment of cases in the Maternity Hospital. I remember reading some time ago of some place in New York where the method of Credé was in a sense adopted, but they made a departure from it by pouring the nitrate of silver from a spoon into the child's eyes. The absolute impossibility, under these circumstances, of following Credé's method of putting in a single drop, is seen at once. If I should advocate any method, I rigorously adhere to the plan published by Credé.

I thank Dr. Wescott for his suggestion, namely, that instead of using the term leucorrhœal discharge, it should be any vaginal discharge. But I would still adhere to the suggestion I made, that the most conservative plan, especially in America, would be to resort to this method only in case of there being a distinct history of a vaginal discharge, and for this reason: we are more liable to suits for malpractice here than they are in Europe, and there are not a few affections existing among infants that in all probability may elude the observation of the practitioner, if ever it comes to the parents' knowledge that the practitioner has put something into the child's eyes immediately after birth, and from any cause whatever the child may be blind, this would in all probability be a source of complaint, of course not justly so, but at the same time of such a nature that the practitioner would rather avoid it if he could. On that ground I would simply use the nitrate of silver in cases where there was some vaginal discharge.—*Western Med. Report.*

RECENT EXPERIENCE IN THE TREATMENT OF EXOPHTHALMIC GOITRE.¹

BY E. D. FERGUSON, M.D., OF TROY, N. Y.,

Secretary of the New York State Medical Association.

Exophthalmic goitre is not a common disease, and yet not so rare as to render it a curiosity. Doubtless the large majority of physicians have had more or less experience in its treatment. If that experience has corresponded with my own, it would have been marked until a recent time by eminently unsatisfactory results, at least in the majority of cases. It is true that occasionally cases would be met which did not make rapid progress downward—cases in which the disease would remain stationary, or even an improvement take place—but until about two years ago it had been the conviction of the writer that but little encouragement could be given the victims of this disease, while the idea of a cure could rarely be entertained. The variety of treatment suggested and the contradictory statements of those treating on its therapeutics justified the conclusion that either the medication was eminently unsatisfactory or a variety of morbid conditions requiring differing treatment had come to be classed as exophthalmic goitre, and the therapeutical as well as the nosological differentiation remained to be made.

Though the disease is one with sufficiently well-defined characteristics to allow of ready recognition, still errors of diagnosis may and doubtless do occur. The fact that enlargement of the thyroid body is not peculiar to this disease, and

¹Read at the meeting of the New York Medical Association, October 23, 1890.

that a frequent pulse is attendant on a multitude of morbid conditions, furnishes us two-thirds of the diagnostic points as of common occurrence, and it is not unreasonable to suppose that occasionally prominence of the eyes may be added from causes not the same as the conditions determining the development of exophthalmic goitre. The conclusion that the condition is not at any rate a pathological unit has been strengthened, in the judgment of the writer, from the results of the use of digitalis, for in every instance in which he felt confident of the diagnosis, that drug not only failed to afford relief, but was apparently productive of injury. In this he found himself in accord with many to whose writings he has had access; and yet, occasionally, benefit or even a cure would be ascribed to digitalis.

Prior to 1888 his experience had been one of nearly uniform failure to relieve or benefit the patients suffering from this disease, at least so far as direct results from the agents prescribed could be fairly assumed; and this statement is made in connection with the fact that all therapeutical measures, including electricity, which had been recommended as useful, had been given thorough and persistent trial.

Being so thoroughly convinced of our resources, it was with reluctance that the care of a pronounced case of the disease was undertaken in the autumn of 1887, and the husband of the patient was quite plainly given to understand that the result would probably be a failure to cure or even stay the progress of the malady.

The patient was a woman, *aet.* 55, with notable exophthalmos, enlargement of the thyroid body, and a pulse from 110 to 120. She faithfully followed the treatment advised, which included tonics, aconite, belladonna, electricity in the form of the so-called central galvanization, digitalis, etc., but after several months she was so much worse as to be confined to her bed with a pulse rate of 120 to 150 and a discomfort in the cardiac region that prevented sufficient sleep, and at times seemed to reach the agony of an angina pectoris.

In deliberating on the course to be pursued in this case, it

occurred to the writer that the rapid, forcible and occasionally tumultuous action of the heart, as well as the changes found in that organ in cases dead from the malady, would favor the idea of an increase in the resistance in the systemic arteries as one of the events of the disease, and as digitalis was believed to increase arterial tension it was concluded that that fact explained its failure to quiet the excited heart action.

The then new therapeutical agent, strophanthus, was said to lessen the resistance in the systemic circulation, and with that object in view its administration was begun. The patient at that time was in a pitiable condition. She was unable to walk; in fact, every change of position brought on exceedingly uncomfortable, generally quite painful, sensations in the pericardia, and emaciation had advanced to an extreme degree, thereby emphasizing the exophthalmos. A measure of relief was manifest soon after commencing the use of strophanthus, which was some three or four months after the case was taken in charge.

As soon as a positive degree of improvement in the rate and quality of the pulse and the general condition of the patient was manifest, all treatment aside from the administration of iron, arsenic and strophanthus was omitted, and the improvement continued, till in about six months the pulse was reduced to 80, the patient was in every way comfortable, and able to take a fair amount of exercise without inconvenience.

By one of those curious coincidences of the observation within a short interval of time of a number of rather rare cases of disease, it fell to the writer's lot to see within a few months eight cases of the disease under consideration, and thereby quite an amount of clinical material was placed at his disposal.

One of the early cases was seen in consultation, and was the first instance of the disease ever seen by the attending physician. The patient was a woman, *aet. 41*, with a pulse rate of 150, and with the usual dyspnoea. She was at once put on the strophanthus treatment and the improvement was rapid. A few weeks after this case was seen, and as another curious coincidence, the same physician brought to my office another

case in a man *aet.* 41. In this case the pulse was 130 and the dyspnœa on exercise was troublesome, but not as extreme as in the preceding case. He was placed on the same treatment and improvement was prompt. He continued the medicine for about ten months, except a few days, when he took spartein, but returned to the strophanthus under my advice. I examined him recently and found him in good health and with a pulse rate of 76 per minute.

It is not necessary for me to give details of all the cases, it being sufficient to state that the administration of strophanthus afforded relief and allowed a return to ordinary occupations in every instance excepting one, and in that case there was associated pulmonary disease, probably of a tuberculous character, which implied an unfavorable termination aside from the exophthalmic goitre. In this instance there was no improvement in any of the symptoms, the case passed from my observation and doubtless progressed to a fatal issue, though I have been unable to trace the history. Several of the cases are still under observation, and I consider them still under treatment, for though they have improved so as to consider themselves in some instances as cured, in my own judgment the treatment should be continued with more or less regularity for a longer period of time. I have also excluded from my report some cases recently seen, and in some cases seen only once and that failed to keep me advised of their progress.

In no instance has either the exophthalmos or the goitre been entirely removed, and so far as the goitre is concerned I should not expect its removal, for where the enlargement has existed for some time it becomes of so dense or fibrous a consistence as to exclude the idea of its complete removal. So far as I could judge, however, there was a notable degree of improvement both in the exophthalmos and in the enlargement of the thyroid body, but it is manifestly difficult or even impossible to express in mathematical terms the changes in these features of the disease as can be done in the rate of the pulse. In the case of the heart, however, and in particular in the instance of the patient first cited, I was satisfied that not only

were the rate and rhythm of the contractions favorably influenced, but there undoubtedly existed a dilatation of the left ventricle, which improved so as to leave no physical or symptomatic evidence of cardiac lesion.

Though recent pathological considerations tend to place exophthalmic goitre in the category of the neuroses, and to find the locus of its origin in that specially vital region—that neuropathic switch-board—the vicinity of the floor of the fourth ventricle, still the evidence is not such as to give us any clew concerning its etiology or treatment aside from what we can gather from clinical observations, and consequently there is no explanation to offer as to the method by which strophanthus affords relief, aside from the idea that first suggested its use, and that was to relieve an apparently overtaxed heart through the lessening of the resistance in the systemic circulation, which was claimed to be its action. This explanation may not be in full harmony with the results of physiological experiments, and particularly with what is known as Marey's law, that there is an inverse ratio between the arterial or general blood pressure and the rate of the pulse, the heart apparently being hastened in its rapidity when resistance is diminished, as would be the case in an ordinary piece of machinery.

While accepting in a general way the conclusions from physiological experiments, there are some claims made, relative to the dynamics of the vascular system, that fail to gain my assent, or at least to stand as explanations, and the disease under consideration is an instance, for in it the action of the heart more nearly resembles that which attends and follows violent physical exercise than any other condition with which it can be compared, and assuredly we will hardly concede that the rapid, violent and excited action of the heart in those who are climbing mountains is due to diminished arterial tone. Whether we are to consider arterial tone and systemic resistance as occasionally convertible terms is also a problem, though an intimate relationship is manifest. Incidentally it may be noted that the mystery and perplexity of some points

in the physics of the circulation of the blood renders a climax in the claim made that blood-vessels may actively dilate, and thereby practically solve the problem of lifting oneself by the boot-straps.

If we grant the power of forcible dilatation on the part of the blood-vessels, it is not difficult to understand that the range of change in vascular resistance from the tonic contraction of arteries to their active dilatation, and consequent virtual suction effect, would be sufficient seriously to disturb the heart. A corresponding variation of resistance would be disastrous were it not for the "governor." But we are told the heart has such a "governor," and that it is located in the vicinity of that part of the medulla occupied by the restiform bodies. We will consent that physiological experiments seem to justify such a claim, though pathological observations have not so far contributed any positive evidence, and a careful sifting of the evidence will not justify positive conclusions—nothing more than the probability that in the medulla there is a centre having control over the circulation of the blood, and that strophanthus may in some way "govern" this.

Aside from any theoretical considerations as to the way in which the agent acts, the fact remains that benefit was apparently the direct result of its use, a benefit so notable as almost to justify the claim of a cure in some of the cases, but it would be wise to stop short of such a claim, for it was observed in one of the most favorable instances that while the result in a general way was eminently satisfactory, still any mental anxiety or disquietude was sufficient to raise the pulse rate from about 80 to over 100 for a period of several days.

The period of time during which the agent has been on trial is altogether too brief to justify too glowing claims for permanency of results, and the writer cannot divest himself of the fear that the improvement will not in the majority of cases remain permanent.

The only claim that is justifiable at present is that strophanthus has proved more notably beneficial in the treatment of exophthalmic goitre than any other drug or remedial measure.

A few words relative to the agent itself, or rather its preparations and dosage, may be useful. The only preparation used by the writer was the tincture, but it was observed that a notable difference existed in the taste of different specimens. This difference related mainly to the bitterness, and upon investigation was found to be ascribed by some pharmacists to the length of time the drug was allowed to remain in the menstruum, and by others to the improper predominance of pods over the seeds in preparing the infusion. It was impossible to concede just how the excessive bitterness was induced, but it was apparently due to an oil or oleo-resin which would render the tincture opaque on the addition of water. Several ounces of this oily material were shown to the writer by one pharmacist as having been separated in the process of manufacturing the tincture.

In some instances the presence of a large amount of this bitter principle seemed to be productive of disturbance of the stomach, which was avoided by using other samples with less bitterness, and on the other hand some instances were noted where the bitterness was not objectionable, though on the whole the impression remained that those specimens that were notably bitter did not act as favorably.

The administration was by the conventional method of three doses daily—one at each meal—the initial dose being from 8 to 10 drops, which was increased, if necessary to reduce the frequency of the pulse, to 15, 20, or even 25 drops, and in fact relief was not obtained in some cases until the large doses mentioned had been used. In no instance did unpleasant results appear to be due to the drug, aside from some nausea which was ascribed to the individual preparation used, and apparently due to an excess of the bitter principle.

There have been but few, and those brief notices of the use of strophanthus in Graves' or Basedow's disease, and its use is not advised in any of the recent "year books" consulted by the writer. It had been used by him for over a year, in the treatment of the disease under consideration, before he saw any notice in medical literature of its prescription by others.

Within a year he has seen in the medical journals a few notices of its use, and the reports have been quite uniformly favorable.

Whether its apparent utility will bear the test of time and larger experience is still problematic—at present it seems to be our most valuable therapeutic resource in exophthalmic goitre.—*Jour. Am. Med. Ass'n.*

OBITUARY.

ÉVARISTE WARLOMONT. +

Ophthalmology, and especially ophthalmological journalism, have experienced a serious loss. Évariste Warlomont, the editor of the *Annales d'oculistique*, died at the age of 70 years, on January 22, at Brussels, after a long and painful illness.

Warlomont, the oldest of ophthalmic journalists, had entered our specialty in 1853, as the successor of Florent Cunier in the editorship of the *Annales d'oculistique*, to which he has devoted his life to his last day. Before that time the journal had eked out a very precarious existence; by means of his great talents of organization and his writings, as much as by the select collaborators with whom he always knew how to surround himself, he made of it that powerful publication, which everybody knows, and which will long remain without a rival, as well in foreign lands as in the lands which speak the French language.

Warlomont's genius was a general one; it is almost totally to him, that we owe the translation of that excellent work of Mackenzie, which for a long time has remained the only classical treatise written in our language.

Furthermore, Warlomont's talents as an organizer and his scientific authority allowed him to help greatly in the creation of the International Congresses, which are now so popular.

We know that he succeeded in reviving these Congresses during the one held at Brussels, when they seemed destined to be definitely forgotten.

His was the gift to bring a remarkable clearness into the discussions, and we all remember how he proposed at the London

Congress to vote on the question of the preventive treatment of sympathetic ophthalmia. It does not seem, as if the forms of treatment, which have of late been introduced, will be really able to prevent Warlomont's proposition from surviving even its author for a long time.

During his long journalistic career Warlomont had read many things, and what he read he knew. He recognized better than anybody else, in the writings the old ideas translated and transformed by the recent authors with more or less honestly.

His criticism then was war-like, and, as he himself expressed it, his journalistic talent, always polemically inclined, at such an occasion swooped down in full force. He had often occasion to make use of it.

The *Annales d'oculistique* have lost an alert pen, which will be regretted.—V. in *Archives d'Ophthalmologie*.

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ORIGINAL ARTICLES.

ON THE INJURIOUS INFLUENCE OF THE
ACCOMMODATION UPON THE INCREASE
OF MYOPIA OF THE HIGHEST
DEGREES.

BY DR. V. FUKALA, PILSEN-CARLSBAD.

Donders, as is well known, in his work, "The Anomalies of the Refraction and Accommodation," 1866, page 351, stated that in a myopic eye of the highest degree, by the removal of the lens, an almost emmetropic condition may be gained, but that in this manner the accommodation is sacrificed. In spite of this statement of Donders, I undertook to remove the lens of juvenile myopes of the highest degree by dissection, and later on, by extraction, and have published the successes gained by aphakia, together with the technique of my operation, in *Graefe's Arch. f. Oph.*, xxxvi, Th. 2, S. 23. Casey A. Wood has translated my article, and it has been published in the AMERICAN JOURNAL OF OPHTHALMOLOGY, 1890, page 347. For a long time I have studied the influence of the accommodation upon myopia of the highest degree, and especially upon its increase, and I have reached conclusions diametrically

opposite to those of Donders. Numerous authorities in ophthalmology, whose names will be mentioned in the course of this paper, agree with my opinion in every respect. This opinion is: That the loss of the power of accommodation in myopes of the highest degree is not a disadvantage, but is of considerable advantage; the use of the accommodation, according to eminent authors in our modern times, injures such eyes, in that the myopia is increased since accommodation increases the intraocular pressure. The opinion of Donders is explained by the fact that at the time when he wrote his work (1865), a true explanation of the mechanism of accommodation had only been arrived at a few years previously by Cramer; the additional changes during the act of accommodation have only been observed and studied later on. In the most recent time, only, the noxious influence of the accommodation in myopes, which increases in correspondence with the height of the degree of myopia, has, by many authors, been fully recognized.

The fact that the act of accommodation increases the intraocular pressure in the posterior portion of the eyeball was first found by Coccius (Coccius, *Anwendung des Augenspiegels*, 1853, S. 74). He bade young myopes accommodate and then suddenly look into the distance; the observer then plainly saw that the walls of the eyeball had to withstand a greater pressure during the act of accommodation than in distant vision. A year later Von Graefe made a similar observation. He wrote, in his *Archiv der Ophthalmologie*, Th. 1, S. 37: "Recently, while observing the venous pulse in the retina, I had occasion to convince myself of the fact that this pulsation is increased during the act of accommodation." In Heinrich Müller's *Gesammelten und Hinterlassenen Schriften zur Anatomie und Physiologie des Auges*, Leipzig, 1852, S. 177, we read that the longitudinal fibres of the ciliary muscle produce, when contracting, an increased tension in the vitreous body. Arlt, too, wrote of increased tension in the vitreous body during accommodation (Arlt, *Ursachen und Entstehung der Kurzsichtigkeit*, 1876, p. 42).

Hensen and Voelckers were the first to explain, and to prove by experiments, how it is possible for the contents of the vitreous chamber to be put under increased pressure during the act of accommodation. It is perfectly plain from their experiments how injurious an influence must be exerted by the accommodation, especially in cases of progressive myopia and myopia of the highest degrees. It is readily understood that this portion of the posterior sclerotic, which is less resistant than the rest, will be stretched by a continuous pressure in the vitreous, and that thus the myopia must be increased.

Hensen and Voelckers, in a laborious and technically extremely difficult manner, have shown, first in dogs, then in cats, monkeys, and, finally, on the human eye, that, during every act of accommodation the choroid moves forward. (Hensen and Voelckers, *Graefe's Archive f. Ophthalmologie*, Band. xix, I Theil, S. 156). This movement causes a stretching of the blood vessels, and an exudation from the blood vessels; hence the increase of pressure in the vitreous chamber.

This explanation is universally accepted. The serous exudation during the moment of accommodation is surely not a large one; its influence, however, is summed up during long continued accommodation, and thus acts injuriously upon the less resisting portion of the posterior sclerotic. According to Mannhardt (*Bemerkungen über den Accommodationsmuskel und die Accommodation*, *Graefe's Archiv f. Ophthalmologie*, Band. iv, Theil 1, S. 282), the pressure in the vitreous body is increased during accommodation. Of very great importance for the understanding of the influence of the accommodation upon myopia are the anatomical researches of A. Iwanoff (*Beiträge zur Anatomie des Ciliar-Muskel's*, *Graefe's Archiv f. Ophthalmologie*, xv, Theil 3, S. 295). Iwanoff found that in myopic eyes the circular fibres are atrophic, while the longitudinal ones are hypertrophic. Since the circular fibres are found only in animals on a higher scale of development (monkeys), Iwanoff thinks that they are an addition in order to make accommodation easier.

Myopes use their accommodation less than hypermetropes;

therefore, the accessory portion (the circular fibres) atrophies. The atrophy once begun, and being transmitted by heredity, together with the elongated optical axis, is bound to progress. Under the influence of this condition the ciliary muscle is more and more changed into a tensor choroideæ, which, then, in its turn causes the pathological changes in the sclerotic and choroid. By means of its contraction the ciliary muscle of the myope must necessarily pull more forcibly on the choroid than the muscles of the hypermetrope in whose eye the circular fibres are much more developed. It is, therefore, according to Iwanoff, very probable that the sclerectasia posterior is the direct consequence of the action of the tensor choroideæ.

Horner was of the same opinion as Iwanoff, namely, that there is a direct connection between the accommodative effort and the progress of myopia by means of the longitudinal fibres. The only remaining fibres become hypertrophic, and during the effort of accommodation produce a series of new pathological changes in the posterior portion of the choroid and sclerotic, by which the progress of the myopia is enhanced. Even in a hypermetropic eye a certain pulling of the choroid must take place, and can, when there is great strain on the accommodation, produce an ectasia of the sclerotic, and thus a hypermetropic eye may become emmetropic or myopic (Iwanoff, *loc. cit.*, p. 298). From all this it is plain how much more likely it is for a young eye, with myopia of the highest degree and the innate tendency, to suffer from progressive myopia in consequence of the use of accommodation. Arlt fully confirmed Iwanoff's researches (*loc. cit.*, p. 5.).

I will here emphasize that Donders, also, in his work "On the Anomalies of Refraction," p. 371, writes, that myopes favor the progress of the existing staphyloma by straining their accommodation. Dobrowolsky (*Klinische Monatsbl.*, f. A., vi, Ausserord. Beilageheft), Erismann (*Graefe's Archiv.* xvi, 1 Theil), Mauthner (*Optische Fehler des Auges*, 1876, S. 475, 682, 688), Schnabel (*Graefe's Archiv.*, xx, 2 Theil), Nagel (*Wie ist die Entwicklung der Kurzsichtigkeit zu verhüten?* Stuttgart,

1885), and many others, share the same opinion concerning the accommodation in myopic eyes. Practical observations all lead to the same conclusion, that when there is an inherited tendency, strain of the accommodation will bring about an increase of the myopia. Mauthner (p. 682) says: "It would be unpardonable to allow a myope of the highest degree to work with his correcting glasses, instead of giving him the correspondingly weaker concave glasses, with which he may work without using his accommodation." (P. 688) "In myopia it is our endeavor to avoid all injurious influences; we must, therefore, avoid every unnecessary strain of the accommodation; it is not permissible to allow a myope to do near work with the neutralizing glasses, since that would force him to strain his accommodation unnecessarily, and this is the very thing we want to avoid."

W. Schoen's numerous and laborious observations and articles are of considerable importance for this doctrine. In a series of papers Schoen shows, first, that strain of the accommodation causes an increase of pressure in the vitreous chamber; secondly, that by means of this strain there are gradually developed simple glaucoma, inflammatory glaucoma and senile cataract. (W. Schoen, *Der Accommodations Mechanismus und ein neues Modell zur Demonstration. Archiv f. Phys. u. Anat.*, 1887, S. 224. *Zur Ätiologie des Glaucoms, Graefe's Archiv f. Ophthal.*, xxxi, iv. Th. *Ueberanstrengung der Accommodation und deren Folgezustände. Beitrag zur Ätiologie des Glaucom's und der Aequatorial-Cataract. Archiv f. Augenheilkunde*, xvii, und *Tageblatt der 59. Vers. Deutsch. Naturf. und Ärzte in Berlin*, p. 388; *die Accommodationsüberanstrengung und deren Folgen; Ätiologie des Glaucoms und der Alterscataract. Graef's Archiv f. Ophthal.*, xxxii, 1 Th., S. 195; Schoen, *Accommodation, Excavation und Glaucoma Simplex, Bericht. d. 7 Internat. Ophthalmologen Congresses zu Heidelberg*, S. 251; *die Ursache des Grauen Stares Archiv. f. Augenheilkunde*, 19, p. 77.) Schoen explains the longitudinal fibres and their action in the manner above mentioned. According to his idea, all excavations of the papilla, physiologi-

cal ones as well as pathological ones, must be considered as the results of an overworked accommodation. Among 76 hypermetropic, presbyopic and astigmatic individuals, Schoen found only 5 without an excavation. His researches furthermore showed that among 2800 eyes, 21.5% had excavations of medium size or even reaching to the periphery of the papilla, and that among 758 he found excavations of a high degree and reaching to the edge of the papilla in 40.3%; while according to Germann such excavations are found in only 3.6% of children under the school age. The accommodation may lead to a further peril in progressive myopia, and myopia of the highest degree, on account of the spasm of the accommodation; of course, only the spasm of a higher or the highest degree is of importance, as for instance in the two cases reported by Schnabel (*Graefe's Archiv.*, xxii, 2 Theil), in which —3 and —5 glasses were respectively worn in the presence of slight myopia and emmetropia. Similar cases are reported by Dr. Just (*Klin. Monatsbl. f. Augenheilk.*, x, p. 256); Von Reuss reports the case of a 12-year old boy who in reality had emmetropia, and wore —6 glasses. (Nagel, *Jahresbericht*, 1886, p. 535). Such a spasm of the accommodation leads to real elongation of the axis of the eyeball, and increases the existing myopia. Young myopes who have an excellent area of accommodation bring objects much nearer than is necessary, love particularly to read small print and like to do fine handiwork. Under these circumstances the myopic eye suffers greatly, since in consequence of the strain on the accommodation the degree of myopia becomes greatly increased.

We are, therefore, justified in stating that a myope of the highest degree by means of aphakia does not lose anything concerning the accommodation, but that, on the contrary, he gains to a very considerable extent, since using the accommodation increases the myopia.

THE ILL EFFECTS OF "COQUILLE" GLASSES VIZ: MINUS REFRACTION, WATER- LINES, ASTIGMATIC REFRACTION.

BY F. B. EATON, M. D., PORTLAND, OREGON.

Professor of Ophthalmology and Otology Med. Dep't University of Oregon; Ophthalmic Surgeon to the Good Samaritan and St. Vincent's Hospitals.

The so-called "Coquille" glasses, having a watch glass contour, are much used as protectives to the eyes. Of these there is a number of grades; from those that are made by pressing the heated glass in a mold, to those, which, according to the average optician, are ground, though these latter are probably also only a better grade of pressed glass.

For years I have never permitted any patient, except those who are myopic, to wear any form or tint of coquille, because of the concave refraction and the distortion resulting from flaws in the glass, technically termed "water lines." Lately my attention has again been called to these glasses.

A young student consulted me, complaining of asthenopic symptoms. He said he had been using a pair of smoke coquilles when studying at night, on account of photophobia. Their use had seemed to aggravate rather than relieve his trouble. I carefully neutralized these divergent menisci with the following result: Refraction right glass: $-0.25s \cap -0.25c$ axis 180° ; left glass: $-0.25s$.

Patient accepted O.D. $+0.75c$ axis 90° ; O.S. $+1.00c$ axis 90° for distance, and for reading; O.D. $+0.75s$; $\cap +0.75$ axis 90° ; O.S. $+0.75 \cap +1.00$ axis 90° , which gave him marked relief.

This led me to test a considerable number of coquilles, with the following results: Of 13 pairs of poorer quality, or 26

glasses, 4 pairs or 8 glasses only were devoid of cylindric refraction, all being -0.25 sphericals. Of the remaining 9 pairs the refraction of 7 pairs was concavo-cylindric on both sides (14 glasses), and of the remaining 2 pairs, one glass was a concave sphere and the other a concave cylinder. The average amount of minus cylindric effect was 0.25 D in the 14 glasses, and was remarkably regular. The angle of the axis was 115° , 80° , 90° , 60° , 15° , 180° , 105° , 75° , 10° , 160° , 130° , 180° , 90° and 11° respectively. One glass was a $-0.250s$ $\square +0.25c$ axis 10° . All these had more or less "water lines." Of 20 pairs of better quality (40 glasses), I found 11 pairs (22 glasses) which were spherical concave, the refraction in all but one of the 22 glasses being $-0.25sD$. In three pairs the refraction of both glasses was spherocylindrical, and in 6 pair one glass was a minus spherical, and the other had a cylindric refraction only. The average cylindric refraction was -0.25 in the 12 glasses, but was more regular than in the poorer quality, the axis being at 120° in five glasses, 60° in two, 180° in three, and 105° and 103° once each. The refraction of one glass was $-0.50s$ $\square -0.25c$ axis 180° .

I have been able to procure for examination only a few of the imported coquilles, which are sold at a higher price than any others in the market. Those I have tested are entirely free from water lines, but the amount of minus spherical refraction is higher than in the cheaper grades, and the average amount of cylindric effect is the same. I have tested the surfaces of these glasses by the Geneva lens measure or gauge (*Arch. of Ophthal.*, vol. xx, No. 1), and find the concave surfaces to be the segments of a sphere of shorter radius than the convex. Thus one glass gives anteriorly in the horizontal meridian $+11$. D; posteriorly in the same meridian -12.50 D; but the glass is about $1/32$ inch thick, and the actual difference obtained by neutralization is, therefore, only -0.50 D; they are, then, divergent menisci.

Now, it is true that the average amount of minus spherical refraction discovered and recorded above is not great, and also that the amount of astigmatic refraction is not great; but

no medical man, to put it differently, would willingly, if he could, so alter the refraction of an eye as to add to one already hyperopic even a quarter-dioptry of that refractive condition; but that is precisely what is done when the so-called coquille which is really, as shown, a divergent meniscus, is placed before such an eye. Again, a quarter-dioptry of astigmatism, even when according to rule, is looked upon as undesirable, to say nothing of axes at oblique meridians, and against the rule. In short, the best quality of coquille, even if free from cylindrical effect, can never be desirable except to a myopic eye. Moreover, as I have demonstrated, both spherical and cylindric refraction amounting to half a dioptry is not unusually found even in good grades of coquilles.

Finally, large flat smoke spectacles have all the advantages and none of the disadvantages of any coquille, save only their price, which, however, can hardly be held worthy of consideration when the interests of eyesight are involved.

CORRESPONDENCE.

PRELIMINARY CAPSULOTOMY IN THE EXTRACTION OF CATARACT.

GOVERNMENT OPHTHALMIC HOSPITAL,
MADRAS, EAST INDIES.

January 15, 1891.

EDITOR AMERICAN JOURNAL OF OPHTHALMOLOGY.—In the October number of the AMERICAN JOURNAL OF OPHTHALMOLOGY, on page 343, I notice an article entitled "Preliminary Capsulotomy in the Extraction of Cataract," by Dr. T. I. Tyner, of Austin, Texas, being a selection from the *New York Medical Journal*.

In the article referred to, Dr. Tyner says: "Owing to the great amount of literature recently devoted to the subject of cataract extraction, I owe it to you as a matter of courtesy, as well as in justice to myself, to say I would not presume to bring it forward now, had I not failed, after diligent search, to find a precedent for the operation which I shall hereafter describe, and which I believe possesses some merit."

He then proceeds to describe the operation thus: "A Bowman stop-needle is thrust into the anterior chamber—the pupil having been previously dilated—the point of which, and also the entire field of the incision, are in full view."

"The capsule is now lacerated in its upper quadrant, the line of incision corresponding to the upper pupillary curve of the iris. In this manipulation and in withdrawing the needle, the greatest care should be observed that no aqueous is lost. The eye is now practically undisturbed, and as favorable for the

corneal section as before, which should be done quickly, using a Graefe knife, preferably rather broad. When the section is finished, pressure with the flat of the blade causes the corneal opening to gape, when, at the same moment, counter-pressure with the fixing forceps below aids the expulsion, and the lens glides out through the still open pupil with surprising ease."

A little further on, in another paragraph, he proceeds to narrate the circumstances which "led up to the development of the operative procedure above described." I again quote from the article under notice: "In July, 1885, I operated on a Mexican, and while I was opening the capsule, having done an iridectomy, fluid vitreous escaped so rapidly that the globe so collapsed that the lens could only be detected by the aid of the iris forceps, having fallen into the posterior chamber. Singular to say, there was a good recovery with useful vision, which result encouraged me, a few weeks later, to attempt the extraction in the other eye. Anticipating the same condition of the vitreous, the thought suggested itself to open the capsule with a needle previous to making the corneal section. This was successfully performed, and while there was loss of vitreous (fluid), it was slight compared with the first. This case is recorded in the published statistics of Texas Surgery in 1886."

Without wishing, in any way, to depreciate the work of Dr. Tyner, and the method he has elaborated in the removal of a cataractous lens, I think it right to him and myself to mention that since the year 1879, I have operated on 3,667 cases of cataract in the manner he has described. In the year 1884, while on furlough to England, I wrote an article entitled "A Statistical Review of 1,767 Cases of Cataract," which appeared in the August number of the *Ophthalmic Review*, published in London by I. and A. Churchill, London, and by P. Blakiston, Son & Co., 1012 Walnut Street, Philadelphia. In that article I mentioned that the method of operation I had adopted recently was by laceration of the lens capsule previous to making the corneal incision. Up to the date of the publication of that

article I had performed 674 such operations, and the results, compared with other methods, are shown in the statistical tables which are embodied in that paper. Since that date I have performed 2,993 extractions of cataract by the same method with considerable success. In fact, I employ no other procedure in all forms of cataract occurring in persons above 25 years of age. I hope shortly to publish the results of all my cases of cataract operations, amounting to upwards of 5,000.

The reasons for my adoption of this method of operation are mentioned in the article in the *Ophthalmic Review*, to which I would refer your readers. By the mail which carries this letter, I also send for your acceptance a reprint of that article.

E. F. DRAKE BROCKMAN, F.R.C.S.,

Sup't Gov't Ophthalmic Hospital, Madras.

NEWS.

EDITOR'S NOTICE.

Messers J. H. Chambers & Co. have at present in press an Oculist's Index Rerum, compiled by our esteemed collaborator, Dr. S. C. Ayres, of Cincinnati. The Index, which is complete in every respect, is herewith highly recommended to our readers. It will be placed on the market about the middle of next month.

THE NEW YORK OPHTHALMOLOGICAL SOCIETY.

The following officers have been elected for the ensuing year: President, Dr. H. S. Oppenheimer; Vice-President, Dr. J. B. Emerson; Secretary and Treasurer, Dr. John E. Weeks; Committee on Admissions, Dr. J. S. Prout, Dr. D. B. St. John Roosa, and Dr. Henry D. Noyes.

DEATH OF DR. GEORGE R. CUTTER.

The death of Dr. George R. Cutter occurred on Wednesday, the 11th inst. The deceased, who was 50 years old, was a graduate of the College of Physicians and Surgeons, of the class of 1861. He was one of the surgeons of the New York Eye and Ear Infirmary, and was the author of a German-English medical dictionary. For several years preceding his death he had lived in Brooklyn.

SOCIETY PROCEEDINGS.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, JANUARY 29, 1891.

HENRY POWER, M.B., F.R.C.S., President, in the Chair.

NOTE ON AN UNUSUAL RESULT OF CATARACT EXTRACTION.

DR. BERRY (Edinburg) gave an account of a patient, a female, æt. 72, upon whom he operated. The extraction was performed on November 27, about midday, and just at the termination of the operation an escape of decidedly fluid vitreous took place. About twelve hours later pain began, and was followed by vomiting. At 11.30 next day the dressing was distended with blood. Shortly afterwards the patient had an epileptic seizure, followed within the next three hours by two more. No further fits occurred; the patient had never previously suffered from them. Dr. Berry brought the case before the Society in reference to the relation between the intraocular haemorrhage and the epileptic attacks. He ventured to suggest in explanation that the pressure of the blood in the eyeball caused an irritation of the intraocular sensory nerve filaments, resulting first in sickness and afterwards in a more marked nerve explosion.

MR. CRITCHETT spoke of a case of intraocular haemorrhage coming on apparently six or eight hours after extraction of cataract, and probably induced by the reduction of tension from gradual leakage of abnormally thin vitreous.

MR. EALES mentioned a somewhat similar case, in which

the vomiting following a general anæsthetic appeared to be the cause of the bleeding.

THE PRESIDENT cited an incident in his own experience in which an epileptic seizure occurred in a patient during the operation for cataract. He was able to complete the section; and then waited till the fit had passed off to finish the operation.

ON SOME POINTS WITH REFERENCE TO THE CONNECTION BETWEEN ACCOMMODATION AND CONVERGENCE.

DR. BERRY read this paper, in which, after admitting that the ordinary rough tests for latent deviations of the eyes afforded valuable though not very accurate information, he described the methods he had adopted for measuring these latent deviations, and ascertaining the relation between accommodation and convergence. For these tests, the results of which were given in metre angles and dioptre, he was indebted to Dr. Ernest Maddox. The experiments of Donders and Nagel had shown, in reference to the curves of relative accommodation and relative convergence, that the amount of disassociation between accommodation and convergence was subject to individual differences, could be increased by practice, and differed for varying degrees of accommodation or convergence. The amplitude of relative accommodation or convergence was greatest at the reading distance and beyond it. If the latent position of the eyes were tested, it was found that the relative divergence almost always increased with the nearness of the object of fixation. From the examination of 120 persons in reference to the latent position of the eyes in distant fixation, he had found that in emmetropia a large proportion had either perfect or nearly perfect parallelism; in myopia perfect parallelism was less frequent, and the degree of latent divergence was higher; in hypermetropia also parallelism was less frequent than in emmetropia, and latent convergence was more frequent and more considerable than latent divergence. From the examination of even this limited number of cases it became

evident that in emmetropia, and still more strikingly in ametropia, there was necessarily intimate relation between accommodation and convergence. In ametropes tested with and without correction this was very manifest. Dr. Berry showed diagrams giving the curves of relative accommodation and convergence (expressed in metre angles and dioptres) in the different conditions of refraction, and illustrated his remarks by examples from the patients he had examined.

MESSRS. HARTRIDGE and ADAMS FROST interrogated the reader of the paper in reference to the visual acuity and the age of patients examined, and spoke of the value of Maddox's test as showing that latent deviation was much more common than was generally supposed.

MINER'S NYSTAGMUS AMONG THE SOUTH WALES COLLIERs.

MR. TATHAM THOMPSON, who read this paper, first called attention to the uncertainty existing as to the causation of the disease. The two most commonly accepted causes were: First, persistent strain of ocular muscles, especially in those miners who worked lying on their sides; secondly, insufficient stimulation of retina from imperfect illumination. After calling attention to the statement so frequently made that nystagmus only occurred in those engaged in the process of "holing," where the miner lay on his side with the eyes directed obliquely upward, Mr. Thompson said that in the South Wales district there were special opportunities of judging between these two points of "position" or "illumination." The coal worked there was of two kinds—"house coal" and "steam coal." As a rule miners engaged in cutting "house coal" worked in their "seams" with very little head room, some "holing," the majority working "long wall." Safety lamps were the exception. On the other hand, the "steam coal" miner had, as a rule, six to eight feet of head room, the seams being thick; no "holing," all "long wall" work, which was done principally standing, but with much poorer illumination, owing to the necessity of using safety lamps. It was pointed out

that in the former group there were all the conditions which, according to the supporters of the "ocular muscle strain" theory, should induce nystagmus. As a matter of fact, the disease was extremely rare among the "house coal" workers, except in a few cases where safety lamps were used; whilst it was very frequently met with amongst the "steam coal" miners. Mr. Thompson had collected evidence from colliery surgeons, engineers, managers, and workmen from all parts of the district, and held that the general consensus of opinion pointed emphatically to the imperfect illumination being a potent, if not the essential, factor in the causation. Several of the medical men, whose experience on the subject he had sought, had been for years in districts where "house coal" had been worked and "holing" practiced, but, who, until the "striking" of the "steam coal" and the introduction of the safety lamp, had never seen miner's nystagmus. Cases were quoted where those suffering from the disease on using the safety lamps had been relieved on going back to work with the naked light. The absence of nystagmus amongst the "laborers" and "hauliers" was explained by the fact that their occupation was much more varied, as a rule with better illumination, and that much of their work was done by "feel," there being nothing like the necessity for continued strain of vision in semi-darkness. The symptoms shown were usually "dazzling," difficulty in fixation, and hemeralopia, but the writer had very rarely found vertigo, vomiting, or incoordinate movement of the extremities. In trying to induce nystagmus, attempted fixation of vision in a dark room had been found quite as effective as the oblique upward vision with the head flexed. The relation of miner's nystagmus to that induced by corneal and lenticular opacities and congenital deficiencies was considered, and the influence of imperfect stimulation of retina in both cases pointed out. Mr. Tatham Thompson went on to point out that errors of refraction, and especially hypermetropia and hypermetropic astigmatism, were very commonly met with in those suffering from miner's nystagmus; it was exceptional to find it in the emmetrope. He suggested an inquiry in this

direction as likely to prove of value. His opinion had been strongly corroborated by the evidence of Mr. G. A. Brown, of Tredegar, who had some years ago found hypermetropia to be a very constant accompaniment of nystagmus. In conclusion, he said: "I would submit that I have brought reasonable evidence to show that visual strain, with insufficient illumination, is, at any rate, as great a factor in the causation as strain of the ocular muscles; that the disease is by no means confined to those whose work is done lying down, and that errors of refraction, especially hypermetropia and hypermetropic astigmatism, are predisposing causes."

MR. SNELL (Sheffield) said that a knowledge of the working of a coal mine was very essential to the proper understanding of miner's nystagmus. He had at different times been put to some trouble by statements which on investigation proved groundless. The reader of the paper did not appear to have proved the correctness of his assertions as to the men's attitudes in the pits he mentioned, by observations made while the men were actually at work. This was to be regretted as it was important. Opinions were of no use for the elucidation of the question: facts were required. Mr. Snell referred to his own investigations, extending over many years, during which time he had endeavoured by every possible means to acquire an intimate knowledge of the manner in which miners worked. He estimated that at least five hundred cases of nystagmus had been under his treatment, and he had notes of over one hundred cases. His remarks were based on facts thus obtained. It was impossible to regard imperfect illumination (safety lamp) as the chief factor in causation, because cases occurred in miners using naked light. He mentioned cases of his own, and referred to the observations of others. The influence could only be secondary. The prime cause lay in the attitude assumed by the miners throwing their heads and eyes obliquely. "Holders" were the class prone to the disorder. They formed only a small proportion of the total workers in a pit, and it seemed to follow naturally that there was something specially prejudicial in their work. He alluded

to different facts supporting his contention, and said that the results of treatment were distinctly corroborative. Men over and over again recovered without leaving the pit if they changed their work, but became speedily worse if they returned to their old occupation. He referred to cases like this, and concluded by saying that his later observations were, decidedly corroborative of his published ones.—*Brit. Med. Jour.*

SELECTIONS FROM AMERICAN MEDICAL JOURNALS.

PAPILLITIS, OR INFLAMMATION OF THE INTRA-OCULAR END OF THE OPTIC NERVE; ITS ÆTILOGY AND CONNECTION WITH INTRA-CRANIAL DISEASE.¹

BY CHARLES STEDMAN BULL, M.D.,

Professor of Ophthalmology in the University of the City of New York; Surgeon to
New York Eye and Ear Infirmary; Consulting Ophthalmic Surgeon to
St. Luke's Hospital and to St. Mary's Hospital for Children.

The Optic Disc or Papilla; the Intra-Ocular End of the Optic Nerve.—The intra-ocular end of the optic nerve, as seen with the ophthalmoscope, is the only nerve in the body which is visible to the eye. The nerve fibers on entering the eye radiate and spread out in and upon the retina, but not equally in all directions. They are more numerous on the nasal side, and above and below, than they are on the temporal side. The minute nutrient vessels of the disc are derived partly from the short posterior ciliary arteries and partly from the central retinal artery, twigs from both of these sources uniting to form the so-called "circle of Haller," which surrounds the optic nerve behind the disc. The nerve enters the sclerotic through a funnel-shaped opening, the wider part of which is directed backward. The central depression in the disc is called the "physiological cup" or excavation, and its size and depth are determined by the arrangement of the nerve fibers. Its color

¹Read before the New York Academy of Medicine, December 18, 1890.

is usually paler than the rest of the disc. The boundary of the disc is the "choroidal" ring, the edge of the opening in the choroid corresponding to that in the sclerotic. As the latter is the smaller of the two, a narrow rim of sclerotic is seen within the "choroidal ring," which is known as the "sclerotic ring." The trunk of the optic nerve has a double sheath. The inner sheath is delicate, closely surrounds the nerve, and is continuous with the pia mater of the brain. The outer sheath is thick, dense, fibrous tissue, which merges into the sclerotic, and at the optic foramen is continuous with the dura mater. The vaginal space surrounding the optic nerve is continuous with the subarachnoid and subdural spaces around the brain. As the nerve enters the eye, the vaginal space passes inside the posterior part of the sclerotic opening. This space is here, according to some authors, closed, while according to others it is continuous with the lymphatic spaces in the optic nerve and retina.

There are certain pathological changes occurring in the eye which are common to both optic nerve and retina. When the retina is inflamed, the optic nerve is very apt to participate in the process. But the disc also undergoes inflammatory changes independently of the retina. These pathological changes are of two kinds: increased vascularity usually associated with swelling, and diminished vascularity commonly accompanied by shrinking. The former are more or less inflammatory and are sometimes, though wrongly, classed together as "optic neuritis." In speaking of the inflammatory changes occurring in the intra-ocular end of the optic nerve I shall employ the term "papillitis," as first proposed by Leber, in order to avoid confusion.

The signs of increased vascularity or inflammation of the papilla consist usually of several more or less distinct stages:

1. There is simple congestion or abnormal vascularity, characterized by simple redness, without swelling or obscuration of the edge of the disc.

2. Congestion with œdema, slight papillitis, characterized by

redness, swelling, and more or less complete obscuration of the edge of the disc.

3. True papillitis, characterized by greatly increased redness and swelling of the disc, with total obscuration of the edge of the disc, and often of the entire disc itself.

Simple Congestion.—A few words in passing in regard to simple congestion. Increased redness is the usual symptom of tissue hyperæmia, but it is of much less value as a sign of hyperæmia of the optic disc than in the case of other tissues, on account of the great variation which may exist in the amount of normal redness. The apparent tint of the optic disc is a very frequent source of error in ophthalmoscopic examination of the eyes by unskilled observers, and its importance is greatly overestimated. It is significant only when it presents special characteristics, or when developed under repeated examinations, or when it is more pronounced in one than the other. Gowers is right when he advises that the term congestion or hyperæmia of the disc is best restricted to those cases in which the increased vascularity exists alone without any demonstrable change in the appearance or distinctness of the edge of the disc.

Papillitis.—Congestion with œdema may be regarded as the first stage of papillitis. The normal pink tint of the disc becomes increased, the edge of the disc is blurred, and there may be a more or less distinct halo surrounding it. The center of the disc may be much redder than the periphery. The vessels may be normal or the retinal veins may be enlarged. These appearances are said to be the effect of pressure on the retinal vein, causing passive congestion of the retinal vessels, but they may occur without the least sign of mechanical congestion.

From congestion with œdema to actual inflammation the transition is one of degree alone. The term "papillitis" should be restricted to those cases in which the swelling, redness and opacity are sufficient to conceal the edge of the disc. The changes here observed are due not merely to increased congestion and œdema, but to changes in the optic-nerve fibers

and surrounding nerve tissue. The different appearances on the disc in different cases, and in the same case at different times, have led to the introduction of two terms to describe different varieties of inflammation—viz., first, “descending neuritis,” and second, choked disc. In true “papillitis” we have proliferation of nuclei, escape of leucocytes into the connective tissue, and finally degeneration of nerve structures. As the swelling of the disc increases, white lines and spots on the disc are not uncommonly seen, often corresponding to the position of the arteries. Hæmorrhages, usually small, are not uncommon. The arteries show little change, but the veins become dark and tortuous, and sometimes dilated. In the early stages of papillitis from tumor they are said to be less frequently dilated than in papillitis from meningitis. As the papillitis goes on, the swelling increases and often becomes so great that there may be great difficulty in seeing the disc even with a convex glass, and thus the disc becomes markedly hypermetropic. The veins are darker, more dilated, and the arteries are narrowed. Both arteries and veins may be concealed by the œdematosus swelling. This swelling may invade the adjacent retina in all directions for a long distance, and occasionally white patches of exudation are seen, surrounded by small hæmorrhages. It should not be forgotten that papillitis in this stage may disappear completely. A further increase in the inflammatory process is always accompanied by signs of compression and strangulation of the papillary vessels. In this stage the arteries are very much narrowed, hæmorrhages are numerous and scattered over the entire fundus, the veins are distended and tortuous as far as the periphery, and the retina becomes more or less opaque.

An inflammation of the disc, or papillitis, may remain for weeks, or months, or even years, in the lower degrees unchanged, or the most intense strangulation of the vessels and disc may come on in a few weeks. All subjective symptoms may be entirely absent even when papillitis is present, the vision being unimpaired and the field of vision being unrestricted. Photophobia, or intolerance of light, and pain are

usually rare. In the more severe cases of papillitis the sight is always impaired and may be entirely lost. The impairment of vision usually occurs earlier in one than the other, and it may come on slowly or rapidly, but almost never suddenly. A narrowing of the field of vision usually accompanies any marked loss of vision, and very often the defect in the field is irregular. In some cases a defect in the field due to intra-cranial disease, such as hemianopsia or central scotomy, may accompany the peripheral limitation of the field due to the papillitis. This peripheral limitation is sometimes very marked. Another symptom to be carefully noted is a defect in the field for colors, and this may exist even when the vision is unimpaired. The perception for red and green is usually lost before that for yellow and blue.

The papillitis occurring in the course of intra-cranial disease may be accompanied by defective vision, due not to intra-ocular changes, but to a lesion in the course of the optic-nerve fibers or their nuclei of origin. Some authors are of the opinion that loss of vision following intra-cranial disease is more frequent in cases of descending neuritis than in cases of isolated papillitis. This may be true, but it should not be forgotten that it is an exceedingly difficult matter to distinguish ophthalmoscopically between papillitis due to descending neuritis and purely isolated papillitis.

Loss of vision from isolated papillitis never occurs suddenly, but we do meet with it occasionally from brain disease. A symmetrical hemianopsic defect in the visual field points to an intra-cranial cause; and an unsymmetrical defect, especially a loss of the temporal halves of both fields, usually indicates a pressure on the chiasm from distention of the third ventricle. Complete loss of the sight of one eye and defect of the adjacent half of the other eye are probably of cerebral origin. A peripheral narrowing of the field of vision is usually referred to a lesion in front of the chiasm.

Causes of Papillitis.—The most common cause of papillitis is intra-cranial disease; and of these intra-cranial lesions, tumor is much the most frequent. The frequency and severity of the

papillitis do not seem to be materially influenced by either the nature, the size, or the location of the tumor. The next most frequent cause is meningitis; then follow abscess of the brain, hydatid disease, and softening from thrombosis or embolism, in the order named. Papillitis is also occasionally met with in acute diseases of the spinal cord. The diseases of the general system which sometimes cause papillitis are chronic Bright's disease, certain febrile disorders, anaemia from loss of blood, etc. Papillitis may also occur as an idiopathic lesion, or from great menstrual disturbances, or from exposure to long-continued and severe cold. Unilateral papillitis is almost always due to a lesion in the corresponding orbit.

The *duration* of papillitis varies widely. It may reach its height in a few weeks and then subside, or it may be so chronic that months and even years elapse without the slightest apparent change in the ophthalmoscopic picture.

The Relation of Papillitis to Intra-Cranial Disease.—The first definite theory of the method in which intra-cranial disease acts in causing papillitis was advanced by von Graefe in 1859, and still further elaborated in 1866. It was based on certain cases of papillitis, with haemorrhages occurring in the course of cerebral tumor, in which no signs of inflammation were demonstrable macroscopically in the trunk of the optic nerve; whereas, in certain other cases of meningitis in which the ophthalmoscopic changes had been less marked, inflammation was found in the course of the nerve trunk, and this was assumed to have descended from the inflamed meninges. This condition was called "descending neuritis" by von Graefe, who contended that the ophthalmoscopic characteristics were a slight degree of change in the color and swelling of the disc and a tendency to invade the adjacent retina. The cases of brain tumor with marked papillitis and haemorrhages, but with no evidence of inflammation in the nerve trunks, he explained by the theory that they were due to the effect produced on the circulation of the eye by the increased intra cranial pressure, which obstructed the return of blood from the eye by compressing the cavernous sinus. This remarkable effect was

greatly intensified by the unyielding character of the sclerotic ring. To this combined swelling of the disc with haemorrhages and vascular distention he gave the name of "*Stauungspapille*," which we translate as "choked disc."

This "obstruction" theory was accepted as more or less satisfactory until 1869, when Sesemann dealt it the first severe blow by demonstrating that the communication between the orbital and facial veins was so free that the effect of pressure on the cavernous sinus was at once relieved, and the latter caused merely a very transient engorgement of the retinal veins. He also proved that even obliteration of the cavernous sinus produced scarcely any ophthalmoscopic change in the appearance of the disc.

In 1869 Schwalbe discovered that the subvaginal space around the optic nerve is continuous at the optic foramen with the subdural spaces around the brain, and could be injected from them. These factors agreed with previous observations which had been made by Stellwag in 1856 and Manz in 1865—that the sheath of the optic nerve might be distended in optic neuritis caused by tumors and meningitis.

In 1869 Schmidt suggested that the intra-cranial pressure might influence the intra-ocular end of the optic nerve by this mechanism, since the distention of the sheath is usually greatest just behind the eyeball. This theory was supported in 1871 by Manz, who showed how frequently distention of the sheath was met with in optic neuritis, and who believed it to be an invariable occurrence in cases of intra-cranial pressure or increase of the subarachnoid fluid. He thought that the simple pressure on the nerve and blood-vessels might cause the intra-ocular changes, and he endeavored by experiments on animals to demonstrate this effect of the vaginal distention. Injections into the subdural space passed into and distended the sheath and caused engorgement of the retinal veins, and in some cases a transient redness and swelling of the papilla.

Schmidt found, however, that a colored liquid injected into the sheath passed into the lymph spaces in the nerve at the lamina cribrosa, and therefore suggested that the neuritis was produced,

not by the simple pressure outside the nerve, but by the irritating influence of the liquid which passed into these lymph spaces. These theories of Schmidt and Manz have been generally accepted, at least in Germany, as affording the most satisfactory explanation of the origin of optic neuritis.

In 1881 Leber adopted the view that the distention of the sheath is the immediate exciting cause of neuritis, but he doubted the "mechanical-pressure" theory of Manz, and rejected absolutely the "irritation" theory of Schmidt. He suggested that the fluid in the sheath excites neuritis by conveying pathogenic material to the optic nerve behind the eye, and Deutschmann, in 1887, published some experimental evidence in favor of Leber's view and in opposition to the theory of the causation of "choked disc" by distention of the nerve sheath.

In 1863 Hughlings Jackson suggested that intra-cranial tumor caused optic neuritis by its irritating effect, acting as a foreign body in the skull. This theory has been supported by Brown Séquard, and in 1868 by Benedikt; the latter ascribed the effect to irritation of the vaso-motor nerves. This theory assumes that the tumor acts in a reflex influence through the vaso-motor nerves upon the optic disc, and thus leads to its inflammation. This theory, however, has been rejected by most writers on the ground that it involves a mechanism which is not known positively to exist. It is still regarded by Hughlings Jackson, however, as the theory which best explains the phenomena of neuritis.

Edmunds and Lawford hold that optic neuritis, when due to an intra-cranial cause, is secondary to basilar meningitis, and that the inflammation reaches the substance of the nerve trunk through its sheath.

Parinaud believes that neuritis is invariably the effect of distention of the ventricles of the brain, which causes general cerebral œdema.

In our endeavors to elucidate the truth of the causation of "choked disc" or papillitis there are certain facts to be remembered. Optic neuritis, limited to or most intense in the optic

disc, may occur without any apparent intra-cranial disease. Pure papillitis is known to occur in simple anaemia. From a consideration of these facts it seems fair to conclude that the intra-ocular end of the optic nerve is a structure prone to inflammation.

It is a difficult matter to connect papillitis with increase of intra-cranial pressure, for it is the rare exception in chronic hydrocephalus, where the intra-cranial pressure is raised to the highest point of which we have any knowledge. On the other hand, in cases of intra-cranial tumor with papillitis, there may be no sign of increased intra-cranial pressure during the life of the patient. There may be signs of increased intra-cranial pressure in cases of tumor without papillitis. If we reject the theory that pressure on the cavernous sinus is the immediate cause of papillitis, still we cannot absolutely ignore its influence on the retinal circulation. The great distension of the veins and the narrowing of the arteries occur mainly when the inflammatory process has reached a high degree of intensity, and these facts point to the inflammation in the nerve as the cause of the strangulation by pressure on the vessels, and this view is confirmed by pathological investigations. The conspicuous constriction of the vessels is always in the papilla, in front of the sclerotic. Moreover, the most intense signs of strangulation may be seen in cases in which there is no reason to suspect the presence of intracranial disease. Distension of the optic sheath is frequently met with in cases of papillitis, but it is by no means invariable either in cases of tumor or in conditions of increased intracranial pressure. It may be absent in cases of cerebral tumor with papillitis. It may also be absent in cases of tumor with internal hydrocephalus.

It has been suggested that the fluid may be found within the sheath itself. If the sheath is the main lymph-channel by which fluid is conveyed from the eye, its distension in optic neuritis by fluid escaping from the papilla is easily understood. But there is good ground for believing that the fluid found in the sheath passes into it from the subarachnoid space. We

really know very little of the relation which may exist between dropsy of the sheath and optic neuritis. The occasional occurrence of papillitis without it shows that it is neither the invariable nor the chief mechanical cause of papillitis.

It, therefore, seems proper to draw the conclusion that we cannot decide in any given case against the existence of a descending neuritis from examination of a small portion of the trunk of the optic nerve, and that a pathological change in the nerve, deviating but slightly from the normal state, may convey a condition of irritation to the eye which is sufficient to set up actual papillitis.

It also seems proper to draw the following conclusions in regard to the development of papillitis in intra-cranial disease:

1. In cases of cerebral tumor, evidence of descending inflammation may be traced in the sheath or nerve much more commonly than is generally supposed, while in cases of meningitis the evidence of descending inflammation is almost invariable.
2. The resulting papillitis may be slight or may grow intense, but we are ignorant of the causes which bring about this difference.
3. The mechanical congestion in these cases of papillitis does not always result from compression of the vessels behind the sclerotic ring, but does always follow compression by inflammatory exudation in the papilla.
4. Slow increase of intra-cranial pressure has no effect on the retinal vessels, but a sudden increase of such pressure may intensify a papillitis originating in some other way.
5. Distention of the sheath alone is probably not sufficient to cause papillitis by its mechanical effect, but may intensify the process otherwise set up.

In seeking to make a diagnosis as to the cause of papillitis in a given case, we must depend largely on the presence or absence of indications of disease of the brain, or of such disease of the general organism as is known to be accompanied by optic neuritis. A high degree of papillitis with intense strangulation is seldom met with except in cases of cerebral

tumor and some forms of idiopathic papillitis. The slighter degrees of papillitis, not uncommon in cerebral tumor, chronic meningitis and other intra-cranial diseases, and the neuritis which occurs in Bright's disease, resemble each other closely. It is upon the presence of other symptoms that the diagnosis in disputed cases must rest. In considering cerebral disease as a cause, it must not be forgotten that papillitis due to a cerebral tumor may be accompanied for some time by any signs of intra-cranial disease, while on the other hand a papillitis due to some general organic disease may be accompanied by some symptoms suggestive of cerebral disease.

In *cerebral hyperæmia* there is no sufficient evidence to show that the vascularity of the disc participates in any transient cause of cerebral congestion, unless the whole head suffers. In most of the cases of long-continued vascular disturbance there are also signs of grave functional disturbance of the brain. The absence of any marked vascular alteration in the eye in cases of disturbed cerebral circulation is abundantly supported by the testimony of skilled observers.

Inflammation of the Brain.—We know nothing of any ophthalmoscopic changes in acute inflammation of the brain without meningitis. In so-called "chronic encephalitis" there may be very marked papillitis, similar to that found in cerebral tumor, due probably to the propagation of some irritative process from the brain along the nerves.

Gowers thinks that in the rare cases in which haemorrhage or softening from embolism or thrombosis causes papillitis, the effect is probably produced through the agency of a secondary inflammation.

Hæmorrhages on the *disc* or in the *retina* are met with in a considerable number of cases of cerebral haemorrhage. Their most frequent cause is the granular contracted kidney. They indicate the existence of conditions which favor degeneration and rupture of the vascular walls, and they are often associated with cardiac hypertrophy.

Disease of the kidney and *gout* may explain the occurrence

of papillitis when it exists alone, apart from other symptoms. Isolated double papillitis may be due to syphilis.

In *abscess of the brain*, papillitis resembling that due to cerebral tumor is often met with, but it is also frequently absent.

Tumors of the Brain.—Optic papillitis is the ocular lesion in intracranial growth. It is present in various degrees in a large proportion of the cases of tumor. It is not always possible to say on what the occurrence of papillitis depends. The position of the growth has apparently no direct influence on its occurrence, and the indirect influence depends upon the fact that the secondary meningitis at the base is more extensive when the tumor is not far from that part of the base. The nature of the growth does not influence the development of papillitis, for it may occur with all forms of intracranial growth. Slowly growing tumors seem to have less tendency to cause papillitis than those which grow rapidly. Hence we may conclude that intracranial tumors do not cause papillitis by the direct effect of their mass on the intracranial pressure. In most cases papillitis is a transient event in the history of a cerebral tumor, and is not a constantly associated symptom. A tumor may exist and cause symptoms of cerebral disturbance for some time, without leading to any change in the eye. Papillitis may then be developed, run its course, and end in atrophy of the nerves, while the symptoms of the tumor continue for months or even years.

The appearance of the discs in papillitis due to tumor is that of papillitis in its most typical form. It is in most cases double, but often more intense in one eye than in the other. It is probably true that the occurrence of papillitis indicates progress in the growth of the intracranial tumor. If the progress of the latter is arrested or diminished, the papillitis usually subsides and may disappear completely.

The value of papillitis as an indication of the existence of an intracranial tumor is certainly very great. It may be the only unequivocal sign of the presence of organic cerebral disease. It may also give us signs on which to base a prognosis.

A subsidence of papillitis may be regarded as indicating in most cases a retrogression of the growth, and a papillitis of very chronic course may indicate that the progress of the tumor is equally slow.

Papillitis of the usual type is frequently present in *hydatid cysts* of the brain.

The papillitis met with in *intracranial aneurysm* is probably a descending inflammation, extending to the nerve from the inflammatory process which always exists around an aneurysm.

In *simple acute meningitis* of the base papillitis may occur by direct propagation along the nerve. It is very rare in meningitis of the convexity.

In *tubercular meningitis* papillitis is very common.

Von Graefe regarded this form of nerve inflammation as a typical example of descending neuritis, the inflammation passing directly from the membranes to the optic nerves. It may, however, be a true papillitis, and is always double. The same may be said of *syphilitic meningitis* of the base, and of *traumatic meningitis*, though here papillitis is rare. *Meningitic growths* very frequently cause papillitis.

In diseases of the *cranial bones* papillitis may occur, but only as the result of meningitis and abscess. The same may be said of *injuries to the head*, and of *contusion* and *laceration of the brain*.

Diseases of the Nose and Sinuses of the Cranial and Facial Bones.—Some interesting cases have been reported in which papillitis coincided with a persistent discharge of a watery fluid from one or both nostrils. In most of these cases there were also symptoms of chronic cerebral disturbance. The most probable explanation of these cases is that there was an increased intracranial pressure as from internal hydrocephalus, and that the escape of the fluid relieved the pressure indirectly.

Diseases of the Spinal Cord.—Myelitis may be accompanied by papillitis. In *injuries to the spine* the changes in the disc are those of simple congestion with oedema.

Bright's Disease.—In the neuritic form of the intra-ocular complications of kidney disease papillitis predominates largely over the retinal changes. The arteries are usually narrow and often concealed, and there may be small white dots on the surface of the disc with haemorrhages.

In *diabetes* changes in the fundus are rare, but there may be true papillitis, as well as retinitis with haemorrhages. In this connection it is well to remember that papillitis and glycosuria may both be consequences of an organic cerebral disease.

Acute Anæmia from Hæmorrhage.—If the eyes of such patients are examined early in the course, signs of neuroretinitis are commonly observed, sometimes very intense. Von Graefe held that in these cases there is a retro-bulbar hæmorrhage. Ulrich considers that the papillitis in these cases is due to a disturbance in the circulation of the papilla, and he attributes the later changes to the establishment of an abnormal relation between the blood-pressure and the vitreous pressure.

In *leucocythaemia* papillitis has been met with, and in some of these eyes which have been examined microscopically, the papilla was found swollen from oedema and infiltrated with leucocytes.

Sudden suppression of the menses has not infrequently been known to cause acute papillitis, and the same has also been seen in chronic menstrual irregularities.

Papillitis, with and without hæmorrhage, has also been occasionally met with in the eruptive fevers and in malarial fevers, independently of any renal complications.—*New York Medical Journal.*

ON THE PREVENTION OF INFANTILE OPHTHALMIA.¹

BY KARL GROSSMAN, M.D., F.R.C.S.,

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If I were to discuss the treatment and the prevention of the blenorhoea neonatorum, I should have to repeat almost word for word what I said last year before the annual meeting at Leeds; and it will be less tiring and more expedient to distribute a reprint of my paper read on that occasion, and to make a sort of addendum to it. Not that our knowledge of the disease has undergone any great modification. That was scarcely possible, since its etiology and pathology are familiar enough to us all. Neither was there any urgent need to add to the remedies by which it may be treated. We have already a sufficient number at our disposal; and although we shall always be glad to add to our armamentarium such new names as pyotktanin, we need not forget that what we have had hitherto has proved itself thoroughly efficient.

The reason why I recur to this subject to-day is two-fold. First, it is our duty to try and prevent disease. The individual can do something to this end; but individual efforts are limited; and, to secure substantial results, combinations will be needed and State enforcements of precautions. We know how the efforts of the Committee of the Ophthalmological Society on this subject collapsed, because the resolutions which were put forward were not adopted in proper quarters;

¹Read in the Section of Ophthalmology at the Annual Meeting of the British Medical Association, held in Birmingham, July, 1890.

and the matter ended there. Distribution of cards may have been very good as far as it went, but, even if carried out, would have fallen short of the desired effect.

The possibility of the prophylaxis of the disease rests chiefly with midwives, because confinements in those classes which yield the largest percentage of blindness from this cause, are principally attended by midwives and not by medical practitioners. It is, therefore, through the instrumentality of midwives that we must hope to banish this scourge. The present time is very favorable for considering what steps ought to be taken. Of course, legislation can only help here. In Saxony, where Professor Crédé was the first to point out and to prove by thousands of cases the possibility of effectually preventing infantile ophthalmia, the regulations for midwives treat fully on the matter. As far back as 1882 regulations were made, and were further amplified in 1885. In Prussia less strict rules exist, but the midwives are fully instructed as to the danger of the disease, and are directed what to do.

It was, therefore, a great satisfaction to me to see that quite recently the State of New York has legislated on the matter. Through the kindness of Dr. Swan M. Burnett, of Washington, who was with us last year at Leeds (and who personally has been instrumental in bringing about this law), I am enabled to give its text. It is short and decided, and runs thus :

“Section I. Should any midwife or nurse having charge of an infant in this State notice that one or both eyes of such infant are inflamed or reddened at any time within two weeks after its birth, it shall be the duty of such midwife or nurse so having charge of such infant to report the fact in writing within six hours to the health officer or some legally qualified practitioner of medicine of the city or town, or district in which the parents of the infant reside.

“Section II. Any failure to comply with the provisions of this Act shall be punished by a fine not to exceed one hundred dollars, or imprisonment not to exceed six months, or both.

"Section III. This Act shall take effect on September 1, 1890."

Here, then, is a step in the right direction. I think it is all the more necessary for us to take some steps, as a Bill was recently brought before Parliament concerning midwives, and though shelved for six months, is likely to be heard of again.

THE EFFECT OF TERM EXAMINATIONS ON THE VISION OF SCHOOL CHILDREN.

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The system of *term examinations*, now in vogue in our schools, so frequently causes permanent injury to the eyes of the children that it is deemed of sufficient importance to bring before the readers of this magazine

In order to determine the class standing of the pupils, mid-winter and June examinations are held. This procedure calls into play the ambition of both the teachers and pupils. The former, very naturally, are anxious that the class should be able to pass the examinations creditably, since it furnishes an indication of successful teaching; while, on the other hand, the ambition of the children is excited, not only by a laudable desire to excel, but the fact that their promotion is made contingent upon their ability to pass the examination. It follows that, for a few weeks before the expected trial, teacher and pupil are prompted to extraordinary diligence in reviewing the work of the term, requiring upon the part of the children a considerable increase in the number of hours for study, thus trespassing upon the time which should be devoted to recreation or sleep. The depressing influence which such a course must exert over the general vigor of the growing child is too obvious to call for more than passing mention.

It is, however, to the baneful influence exerted upon the eyes of the children that attention is here especially directed. While it is doubtless true that the protracted strain imposed by the preparation for these term examinations falls with more

or less injurious effect upon all, it is fraught with peculiar danger to defective eyes, the percentage of which is so large in our schools that we cannot justly consign them to the operation of the harsh law of "the survival of the fittest." In discussing the hygiene of vision in our schools, we cannot neglect the important fact, now so well understood, that a very large percentage of our children enter upon their school life with congenitally defective eyes. Many of these could not escape injury under the best conceivable educational methods, and should, therefore, become the subjects of professional advice; but a large percentage of those who suffer harm under present methods would, with proper hygienic arrangements, be able to pursue their studies without injury. To this end it should be borne in mind that the injury is consequent upon the prolonged work at a near point, *e. g.*, in reading, writing, etc.

It is not the purpose in this paper to discuss the general principles of the hygiene of vision, but simply to point out the harm resulting from the spasmodic endeavor to make up in a few weeks for the deficient industry throughout an entire term. The many advantages inherent in steady and methodical application in the performance of any set task are well understood and elsewhere practiced, but too frequently neglected in the use of the eyes. The injury results from the infringement of a well-known physiological law. The eye, in common with other organs, becomes congested during the performance of its allotted function, and requires intervals of rest during which the congestion can subside. If, however, the engorgement is pressed beyond the normal limit by extraordinary occasion, or is maintained too long by continuous exertion, pathological processes are set up which impair the integrity of the highly-organized tissues of the eye. Furthermore, the anatomical peculiarities of the eye seem to render it especially liable to hyperæmia and to the resulting injury, since the increased blood supply increases the intra-ocular tension and this in turn retards the ready escape of fluids, thus producing a vicious circle, particularly harmful to the ready-yielding tissues of the

young eye. Now, the system of term examinations under discussion, prompting as it does to weeks of extraordinary and prolonged work at a near point, furnishes all the conditions needed to bring with them the vicious process here suggested.

That these theoretical considerations are of much practical importance finds frequent demonstration in the daily routine of professional work. Were it deemed desirable to cumber the pages of this magazine with the tiresome details of illustrative cases, many such might be cited from my case books, and would only demonstrate the necessity for some modification of the system of examinations now employed. I have very many times been annoyed and disappointed over the almost sudden relapse of choroidal disease, in patients under observation, often with an increase of the refraction, indicating a distention of the eye-ball, brought about by the stress of work required in preparation for the examination at the close of the school year, and this after the steady work of the term had been accomplished without harm.

For example:

Miss H., a pupil in one of our large schools, came for relief from violent asthenopia. She was a member of a family several of whom were sufferers from hypermetropic astigmatism. Her vision was reduced to $1/8$, due to an apparently high degree of myopia, and was associated with flannel-red eye grounds and a commencing absorption crescent at the temporal side of each disc. Under the use of a solution of the sulphate of hyoscyamine the apparent myopia disappeared, the correcting glasses being a simple concave cylinder —0.50 D. axis 180° in each eye. With this $V.=6/11$, and she was allowed to return to her work, which she pursued without harm or serious trouble until the term examination, under the strain of which her symptoms once more returned, together with the so-called spasm of the accommodation simulating myopia, which retired once more under the use of a mydriatic. This experience was three times repeated, once with an actual increase of refraction, doubtless representing a permanent expansion of the eye-ball.

This case is thus briefly sketched, without detail, simply as the representative of a large group.

Satisfactory vision is such an important factor in the educational advancement of the pupil that it should command the earnest attention of those to whom we have committed the grave responsibility of educating our children. It does not fall within the province of the physician to sit in judgment upon the relative merits of the educational methods of our schools, but I submit that in deciding upon the course to be pursued the physical well-being of the child should be seriously considered, and methods shown to be injurious either modified or abandoned.

With reference to these term examinations, I cannot refrain from suggesting, even at the cost of seeming presumption, that, in view of the great strain upon the physical endurance of the children, better results would be reached in the end by a more careful and persistent effort to fix the lessons of the term upon the mind by frequent reviews and careful teaching throughout the term, and by allowing the class standing and fitness for promotion to be determined by the marks for recitation and by the teacher's knowledge of the pupil gained by daily contact. In this I am not unmindful of the practical difficulty of securing a uniform standard for promotion, particularly in our public school system, but this should not be allowed to outweigh the too frequent serious impairment of vision and general vigor consequent upon the present method of term examinations.—*Univ. Med. Mag.*

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ORIGINAL ARTICLES.

THE TREATMENT OF CORNEAL ULCERS BY THE ACTUAL CAUTERY.¹

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Dr. de Schweinitz briefly sketched the history of the introduction of the actual cautery to the treatment of inflammatory diseases of the cornea, quoted the experiences and results of Nieden, Schweigger, Knapp and Gruening, and described the character of the lesion to which the heated point of a galvano- or thermo-cautery should be applied, referring at the same time to certain differences of opinion existing among ophthalmologists as to the exact types of disease which are benefited by this mode of treatment. He then proceeded as follows:

"Enough has been said to emphasize what is well known, that the method is among the most suitable of those employed to check the spread of local infection in sloughing ulcers, and

¹Portion of a paper read to the Philadelphia County Medical Society, February 11, 1891.

it remains to add to the numerous reports upon this subject the few cases that I have treated with my own hand, about thirty in number. These include:

1. Small central ulcers in children of bad nutrition which, either through neglect or imperfect treatment, have tended to form an abscess.

2. Shallow central ulcers in scrofulous patients, the ulcer having a slightly turbid base, very chronic in its course and declining to heal under ordinary remedies; in all of the cases of this character there were the appearances of former granular lids, and in one active trachoma.

3. Phlyctenular ulcers, beginning in the form of small pustules at the corneal border, speedily ulcerating and surrounding themselves by a yellow area of infiltration, and with a strong tendency to perforate.

4. Infecting or sloughing ulcers, associated with pus in the anterior chamber, or, in other words, hypopyon keratitis.

5. Marginal ring ulcer, or that form which is sometimes seen in purulent ophthalmia, occurring just at the circumference of the cornea, often covered up by the chemotic conjunctiva, and very likely to perforate because it is hidden by the swollen tissues and not observed.

6. Herpes of the cornea, one being an example of an ulcer associated with herpes zoster ophthalmicus, and the other of true herpes of the cornea in which a vesicular eruption occurs, breaks down, and leaves an ulcer, that form which has been seen associated with herpes around the lips and nose.

I will not give the clinical history of these cases, as it would burden my communication unnecessarily with detail, except to say that the actual cautery had been applied only after other treatment had been used, either in my hands or in the hands of some one else. I have not a single bad result to record. In three of the cases perforation of the cornea took place with evacuation of the aqueous humor, twice as an accident during the application of the cautery, and once when the ulcer had nearly perforated and Descemet's membrane had bulged forward forming its floor, and I deliberately burned through the

tissue. In the cases of hypopyon keratitis perhaps it would have been wise, as Nieden has recommended, to have perforated the cornea with the thermo-cautery, but as the hypopya were not of great extent, I wished to see whether the application of the cautery to the surface of the cornea alone would produce absorption of the pus.

Method of Application.—Various forms of cautery have been employed, the most suitable being a small Paquelin thermo-cautery, or the galvano-caustic loop; the latter in the form devised by Professor Sattler, of Erlangen, is, according to Nieden, especially satisfactory. My experience has been entirely with more crude instruments, but which have answered the purpose, either a delicate probe suitably made of platinum, according to the recommendation of Gruening, or if this was not at hand, an ordinary steel needle, about the size of a knitting needle. According to the situation of the ulcer and according to the condition of the iris, the eye is either atropinized or eserinized, a few drops of cocaine are instilled to produce anaesthesia, a Bunsen burner is placed adjacent to the head of the patient, the probe is heated red hot, transferred to the point of disease, all of the sloughing material gently but thoroughly cauterized, and without undue pressure. It is not necessary to separate the lids with a stop speculum; in fact, this is probably a disadvantage putting some pressure upon the ball of the eye. They may be separated by the hand of the operator himself, or, if he is to be trusted, by those of an assistant. In restless young children, although not necessary, it is safer to induce general anaesthesia simply for the purpose of securing perfect quiet. After the application the eye may be washed out with a solution of boracic acid, a drop of atropine instilled, and a bandage applied. This latter procedure also is not required, but it has seemed to me to make the patient more comfortable. Quite commonly on the next day the bulbar conjunctiva is considerably injected, the eye looking angry and red; but if the cautery has been applied properly, the ulcer itself is cleaner and healthier, the surrounding cornea less nebulous, and if there has been pus in the anterior

chamber, this, in my very limited experience, has been nearly absorbed. Usually one application is sufficient, but it is well known this may be repeated on the third or fourth day, and indeed several times repeated according to the indications, provided the original destruction of the tissue has not been sufficient. I have never applied the cautery more than three times to the same ulcer.

Subsequent Treatment.—If the case has been unsuccessful, and it is not necessary to reapply the cautery, the treatment becomes simply that of an ordinary corneal ulcer which has been converted from a sloughing process, or from a chronic process, or from a process which relapses into a healthy ulcer, into an ulcer with the impulse of an active stimulation, or into an ulcer with the tendency to relapse removed.

The Question of Scars.—It has been urged against the employment of the actual cautery that a much more dense scar or leucoma was likely to form than when the ulcer was treated in the ordinary way. This, in the experience of the best ophthalmic surgeons, is a mistake. In my limited series of cases it certainly has never occurred that the resulting scar was greater than would have occurred had the cautery not been used; and I am strongly convinced that in every instance the scar was smaller than would have been the case had I not employed this agent. Touching this point, the following quotation from Fuchs² is *apropos*: "On the cauterized spot an opacity always remains, but as one cauterizes only that spot which without this would meet with the ulcerous disintegration, the final opacification, on account of this, will not be greater than it would have been in the first place." As I have just said, in the belief of many, it will not be as great.

In one example of central corneal ulcer going on to the formation of an abscess, after two cauterizations, in the second one of which I perforated the cornea, and in which a cure took place in less than two weeks, although the original disease had been running on for several months in the form of a series of

²Lehrbuch der Augenheilkunde, p. 169.

relapses, the ultimate vision was $20/_{L}$ in spite of the nearly central situation of the disease. In the case of true herpes of the cornea, where a single application of a button cautery, very lightly applied, checked a process that began in September, and was active at the end of the following December, the result was only a faint diffuse haze over the center of the pupillary space, which by the correction of an astigmatism of a half dioptric, yielded a slightly clouded vision of $20/_{xx}$. In a case of nearly central ulcer of the cornea with unhealthy margins, associated with phlyctenula around the margin, which had relapsed a number of times, in which the photophobia was very great and the brow pain severe, and in which good healing took place twenty days after the application, the resulting scar consists of a whitish band running diagonally across the pupil space, with a few old vessel channels traceable from it to the margin and scattered through it several minute white saturated spots; the vision is $20/_{c}$ and one and one-half meter print can be read.

Contraindications.—In very extensive ulceration, involving a large area of the cornea, I would not use the actual cautery, certainly not until I had tried all other means, because in order to make it effectual and to stop that sloughing process, the application would have to be so great as to lead to the possibility of an excessive reaction. It should be remembered, however, that in just such cases very good results have been obtained. I have had no personal experience. The actual cautery should not be applied to an ulcer which has already perforated and to the margins of which the iris has become adherent. Some cases of this character are on record in which a destructive inflammation with subsequent loss of the eye has been occasioned by the traveling back of the inflammation from the stump of the iris. The actual cautery does not seem to me to be indicated in those cases of hypopyon-keratitis in which there is a large ulcer associated with an hypopyon that nearly fills the anterior chamber, and in which it can be demonstrated that the collection is exceedingly tenacious, having assumed the character of a slough. Here Saemisch's

operation would seem to be better, because after its performance a delicate forceps can be introduced, and the offending material bodily removed, or it can be washed out, preferably with the admirable syringe devised by Lippincott, of Pittsburg. As Gruening aptly has said, "In these cases a combination of the two methods appears to be rational, for the actual cautery destroys the septic material of the cornea, and the Saemisch section removes the septic material from the anterior chamber." The actual cautery should not be used simply because there is a corneal ulcer. It is applicable especially to sloughing ulcers, to ulcers in which the spread of local infection is the dominant symptom, to ulcers which decline to heal under moderate means, like the bichloride of mercury method, the compressing antiseptic bandage, the use of eserine, the application of milder cauterizations with solutions of nitrate of silver, powdered iodoform, or scraping the base of the ulcer with a small curette.

Touching the limitation of the suppurative process in sloughing ulcers, Mr. Brudenell Carter somewhat enthusiastically says: "The most potent medical agent for the fulfillment of the first indication is eserine, which has been the means of saving numbers of eyes which without it must have perished." Agreeing thoroughly with this author's estimate of the great value of eserine, not only in sloughing ulcers, but in a host of other forms of corneal disease characterized by solutions in its continuity, we may say that in the event of the failure of this drug and other well recognized treatments, the actual cautery in its power to limit suppurative processes "has been the means of saving numbers of eyes," and with reasonably good vision, which without it might have perished.

ELECTRO-MAGNETIC EXTRACTION OF A PIECE OF STEEL FROM THE VITREOUS CHAMBER OF THE EYE¹

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Although the electro-magnet has had but a limited application in general surgery it has been used with signal success for the removal of steel and iron fragments from various parts of the eye. A full account of this subject has been given by Snell², of Sheffield, and Hirschberg³, of Berlin. Hotz⁴, of this city, has recently published a number of interesting cases.

Instances of this sort are not rare, but the successful extraction of metallic chips from the vitreous body, with preservation of the eye, is sufficiently uncommon to justify my saying a few words, introductory of a case of this kind, which I hope to present to you to-night.

The magnet which I use is Snell's. I find that it is now manufactured by Meyrowitz Bros., and is probably familiar to many of those present. "It consists of a core of insulated copper wire, and this again is enclosed in an ebonite case. To one end of the instrument are attached the screws to receive the battery connections. At the other extremity the core of the magnet projects just beyond the ebonite jacket, and is

¹Read before the Chicago Medical Society, March 16, 1891.

²Simeon Snell: The Electro-Magnet and Its Employment in Ophthalmic Surgery, 1883.

³J. Hirschberg: Ueber die Ergebnisse der Magnetoperation in der Augenheilkunde. Graefe's Archiv f. Augenheilk. Abth. III, 1890.

⁴ F. C. Hotz: Am. Jour. of Ophthalmology, 1889.

topped, and into it screws a needle which fits closely on the end of the instrument by a projecting cap. By this means it is possible to employ any kind of needle the operator may wish, or the case require, either curved or straight. Each sort of needle will, perhaps, be more adapted to a particular case."⁵ It will be remembered that since in electro-magnets the magnetic force decreases very rapidly, as the size of the needle decreases and the distance of its point from the helix increases, it is advisable to employ as large and as short attachments as possible. Another law of electro-magnetism should not be forgotten, viz.: The attractive force is greatest at the moment when the current begins to flow. The small button which serves this purpose should, therefore, not be touched until the needle is in position. Instead of using a quart bichromate element, formerly recommended, I have employed a small storage cell. Its electromotive force is about 2 volts; it admits of easy transportation and answers the intended purpose admirably. It will readily be seen that a piece of iron sticking into the cornea, lodged in the anterior chamber, or entangled in the iris, or even having penetrated the lens capsule, is much more easy of extraction than when it has entered the posterior chamber, because in the latter situation, (1) it is less accessible, and (2) it is very likely to be invisible, owing to the intra-ocular bleeding, which often obscures an ophthalmoscopic view. In the treatment of the following case I had the benefit of the advice and assistance of my associate, Dr. W. F. Smith:

T. J., æt. 24, at 8 A.M., on January 27, last, was struck in the right eye by a minute fragment that flew from a piece of steel he was hammering. He consulted Dr. John Fisher, who very properly ordered a solution of atropine to be dropped into the eye. Dr. Fisher very kindly referred the patient to me, and I saw him at 3 P.M., seven hours after the accident.

He was not then complaining of pain, but felt dizzy. In the upper inner quadrant of the right cornea, close to the lim-

⁵Snell, *l. c.*, p. 7.

bus, was to be seen a faint line which corresponded to a penetrating wound of the iris. The posterior layer of the cornea was streaked with blood, and there was in addition some blood lying free in the anterior chamber. No clear view was to be had of fundus. $V=$ fingers at 50 cm. As the patient at first described the piece of steel as coming from below, and was not very clear as to its probable size, it was thought possible that the sharp corner of a fragment might have made a wound through cornea and iris, and cut its way out again. At any rate it was decided to wait until some of the effused blood had undergone absorption. The conjunctival sac was thoroughly disinfected, more atropine solution instilled, and the eye was dressed with boracic acid powder and a bandage. Three days afterward the anterior chamber is free of blood, but there is a decided pericorneal injection, and the patient suffers from occasional attacks of pain in and about the eye. A wound in the lens can now be plainly seen through the dilated pupil. The posterior pole of the crystalline is hazy, and apparently covered with blood. Two clots can be seen rolling about in the lower part of the vitreous chamber. Only portions of the fundus can be made out. I concluded after considerable questioning of the patient that the fragment came from above the horizontal plane of his face, and as the symptoms seemed to indicate the presence of a foreign body in the interior of the eye, I decided to operate.

Believing that it would not be wise to attempt its removal through the original wound, on January 31, the patient was anæsthetized and a straight equatorial incision (8 mm. long) was made with a Graefe knife through the sclera about a centimeter behind the limbus at the lower outer quadrant of the hemisphere. Another wound of about the same length, but at right angles to this, was first carried through the conjunctiva and Tenon's capsule, so that when both wounds were closed, the vitreous chamber was effectively shut off from the outside air. A bent and flat needle was carefully introduced into the vitreous, and after several re-introductions and "fishing" about, a small bit of steel was withdrawn, attached to the

tip of the magnet end. Little or no vitreous was lost. A few stitches were put through the conjunctival flaps and the eye was again dressed with boric acid powder. The greatest care was observed as to the use of antiseptics, and the wound healed without the least difficulty. The pain and ciliary injection disappeared, and two weeks afterward V = fingers at 1 m. Since then portions of lens matter have presented in the lenticular wound, have produced some irritation (pain, tenderness, circumcorneal redness, etc.,) which had disappeared under the use of hot applications and atropine, and the protruding masses have finally become absorbed. I propose to do an iridectomy, preparatory to needling the cataractous lens, which I trust, is capable of absorption, or perhaps, removal with Bowman's syringe. The extracted metal weighed 17.7 milligrams.

NOTES OF A CASE OF DIABETIC CATARACT OPERATED UPON BY DR. C. R. AGNEW.

BY DAVID WEBSTER, M.D., NEW YORK.

Miss Katie L. S., *aet. 22*, was referred to Dr. C. R. Agnew by Dr. Peaslee, on account of blurring of her sight. She was a teacher, and very anxious to regain the use of her eyes. On March 14, 1876, at her first visit, she had vision $20/_{LXX}$, each eye, and the sight could be raised to $20/_{LXX}$ in either eye, with a -48 c. axis 90° . Ophthalmoscopic examination showed immature cataract in both eyes.

The patient gave the following history: In the fall of 1872 she first experienced symptoms of diabetes, excessive thirst, passing large quantities of urine, general debility, etc. Sugar was found in her urine in considerable quantities. She had been under Dr. Peaslee's care for the last six months, and seemed to be improving.

Fifteen months ago she became very near-sighted, and for about five months wore strong concave glasses. Then, while under electrical treatment, general and local, her near-sightedness passed off, and she went without glasses for about three months, when far-sightedness came on gradually. She has worn strong convex glasses until within the last two or three weeks, when she found that no glasses enabled her to see well, and her eyes became sensitive to light.

April 22, 1876. Vision, $20/_{LXX}$, and no improvement with glasses.

As the cataract seemed to have reached a stage where it neither progressed nor retrograded, and as the young lady was anxious to recover her ability to read, Dr. Agnew decided to

commence operation for the absorption of the lens in the left eye, without further delay.

April 26, 1876. First needling; simply opening the centre of the anterior capsule.

May 26, 1876. Second needling; the anterior capsule opened a little more freely.

September 9, 1876. Third needling; the central portion of the lens stirred up pretty freely.

September 25, 1876. Fourth needling; a very free opening of the capsule and stirring up of the lens.

October 11, 1876. Fifth needling; most of the lens substance is already absorbed.

The pupil was kept dilated by atropine throughout the whole period of treatment.

December 13, 1876. The patient died suddenly, just as she was beginning to enjoy her recovered vision.

While diabetes effects the prognosis, I do not consider it a contraindication to cataract operations. I have had several cases of successful extraction in diabetic patients. My impression is that the eye heals as readily as in patients whose health is unaffected.

ALTERATION IN THE REFRACTION OF THE EYE; CHANGE FROM HYPERMETROPIA TO MYOPIC ASTIGMATISM.

BY S. C. AYRES, M.D., OF CINCINNATI.

Alterations in the refraction of the eye come under our observation from time to time and are always matters of interest. We frequently see progressive myopia and changes from hyperopic to myopic astigmatism. Cases where hyperopic astigmatism has increased have been recently reported. In the case which I shall report there was an alteration from hyperopic to myopic astigmatism, but the symptoms preceding and accompanying this change were so aggravated that I take the liberty of presenting it.

It was in the person of a gentleman whom I first saw in 1872. He then had under atropine test H. 0.5 with perfect vision in both eyes. There was paresis of accommodation and insufficiency of the internal recti muscles. Prisms were ordered and his general condition treated. He abstained from use of his eyes and waited patiently for some improvement. His asthenopic symptoms were so aggravated that he could not attend to his professional work and he finally concluded to go to California and lead an out-door life hoping that this would give him relief. In his new home he engaged in the cultivation of fruit, and while his physical condition was excellent, his eyes seemed but little better. So things went on for several years. He could read but little and the bright day-light was very painful to him and he had difficulty in driving.

In 1884 he went to an oculist in San Francisco, whose name I regret I cannot give, and had his eyes tested. A critical ex-

amination developed the fact that he had myopic astigmatism 1.5 D. H. o in both eyes. These lenses gave him complete relief, and so great was the relief that he said when he got his glasses he sat in the doctor's office and read for two hours, a luxury he had not enjoyed for many years. With these glasses he could see perfectly in the distance and had no further trouble in driving, and daylight was no longer painful to him. He could also read with the greatest comfort by natural or artificial light.

I saw him in December, 1890, and he complained of his glasses for reading. I found that he only needed the convex cylinders for reading. His vision was perfect in both eyes with the cylinders he had worn for six years. For about twelve years he had the most disagreeable asthenopic symptoms and they were not relieved until his myopic astigmatism was corrected. It is not certain how long his eyes were undergoing this change in refraction. It seems probable that he might have had relief sooner than he did.

THE ECCENTRIC GROWTH OF EYELASHES.

BY FRANCIS M. CHISOLM, M.D.,

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An eccentricity in the growth of a hair has been curiously illustrated in the two following cases, the one of which applied for treatment to the Presbyterian Hospital and the other was seen in private practice. Both were alike in their nature, the one occurring in an adult, the other in a child 10 years of age. In each the appearance was of a dark bluish line about half an inch in length running directly upward from the ciliary border of the lid and narrowing down to a point.

In each case when this line was first discovered by the patient it was believed to be a streak of dirt. When, however, after repeated washings it could not be removed and had become a source of annoyance, they applied for treatment to their family physicians, who diagnosed the condition as one of an enlarged superficial vein of the lid and therefore incurable.

When they came under my observation the appearance of the lid with this fine blue-black vertical line under the skin was quite curious. On examining with a magnifying glass it was discerned to be the shaft of a hair. A growing eye lash, as it was about emerging from the free border of the lid, had had its point caught in some unexplainable way under the epithelial lining of the hair follicle. It was in this way diverted from its natural course and twisting directly upon itself, bound down as it was by the cuticle, it had continued growing upward. Acting mechanically as a wedge, pressing upon the epithelium and pushing its way through these layers, it had tunneled for itself a passage under the skin, until the full growth of the hair had been reached.

It was found that as the lash emerged from its follicle in growing the epithelial covering had disappeared near the root, exposing a loop under which a fine probe could be passed. The disfiguring black streak was made to disappear at once from the lid by introducing a fine hook in this loop and pulling the hair out from its artificial sheath. It did not break off but came out entirely and assumed its natural position among the lashes. On account of the nervousness of the child this had to be done under the influence of an anæsthetic.

SELECTIONS FROM AMERICAN MEDICAL JOURNALS.

ACUTE TRANSITORY BLINDNESS AND WHOOPING-COUGH.

BY GEORGE W. JACOBY, M.D.

Bilateral loss of sight of brief duration, and occurring suddenly in patients whose state of health does not direct our attention to any possible ocular complication, must be considered an event of the greatest interest to the neurologist as well as to the ophthalmologist. Such a complication has been known to occur occasionally in certain blood states and to be of frequent happening in cases of uræmia. In the latter condition, in addition to the blindness, other serious uræmic symptoms, such as disordered consciousness and convulsion, are generally present. But cases have been described as occurring after acute diseases in which, notwithstanding the absence of any ureæmic manifestations, the symptom of blindness was ascribed to uræmia, this condition having been assumed to exist from the fact of the urine having been albuminous. Such cases have been most frequently described as occurring after or during scarlet fever, but their occurrence after typhoid is also known.

Cases of this kind were, so far as I know, first described by Ebert in 1868, when he reported three cases of transitory blindness occurring after or during scarlet fever, and one case supervening upon typhoid. All of Ebert's cases also showed symptoms of nephritis.

Cases of transitory blindness occurring after other acute

diseases and unassociated with nephritis or uræmic symptoms must be of great value in assisting the formation of any conclusion as to the nature of the pathological process which produces this alarming symptom. I am able to report two such cases, both of which occurred during an attack of whooping-cough. Two similar cases, also occurring during whooping-cough, have been previously reported by Alexander. My cases were as follows:

CASE I.—Seen first on November 15, 1888. F. L., a girl æt. 6 . I saw the child in consultation with Dr. D. Froehlich, of this city. The girl had had various diseases of childhood, all of which passed over without any serious complications. When two years of age she had an attack of pneumonia, during which she also had convulsions; complete recovery from this attack was made. At various times the child had complained of severe occipital headache, which each time proved to be a prodromal symptom of some other affection (measles, dysentery). The other children of the family have recently had or are just recovering from an attack of whooping-cough. Since several weeks this child also has had a spasmodic cough, which presents all the characteristics of pertussis, but in a mild form; vomiting has occurred several times, but always in conjunction with an attack of cough; occipital pain was also present in the same manner as it had been on the occasion of former sicknesses. The day before yesterday, the mother coming home in the early afternoon, having left the child playing when she went out, was greeted with the remark, "Why did you stay out so late? It is so dark." The mother, attracted by these words, noticed the staring expression of the child and soon became aware that the child was blind. An ophthalmological examination, made by Dr. Gruening the ensuing day, resulted as follows: Pupils dilated *ad maximum*, without reaction to light or to convergence. Ophthalmoscopically, neuritis on both sides without any haemorrhages into the opticus. Quantitative perception of light.

The succeeding day, when I saw the patient, I found a child showing no objective symptoms of any kind, except the ocular

ones, which could be referred to the nervous system. The child's appearance was cachectic, but she was cheerful and did not complain of any ill feeling. The reaction of the pupils was as described above. The kidneys and heart were normal. No headache, vomiting, or fever. The following day (16th) the right pupil reacted to light; child says that she can see. An examination showed that vision was limited to the right eye, and that with this eye the patient could recognize large objects, such as a watch, at five inches. The child was again seen by me on the 18th, when it was noticed that the left pupil also reacted to light and that large objects could easily be distinguished with both eyes. On the 20th further improvement of vision was noted. On the 22d she was also seen again by Dr. Gruening, whose report was, "Pupils react to light and to convergence; the child can count fingers at a distance of the length of the room. Ophthalmoscopically, papillæ slightly hazy."

November 28.—Improvement has been constant; vision now normal; ophthalmoscopic examination negative. Since that time the child has been and is now perfectly well.

CASE II.—October 8, 1890; M. C., boy *æt.* 8. Patient has had a whooping-cough since the end of August. The course of the affection had been a perfectly normal one until October 1. The spasms of cough were not unusually severe, and there were no complications of any kind. The boy, who had always been anæmic, had at various times before and after the attack of cough complained of headache and had also vomited frequently during the paroxysms of cough, but both headache and vomiting were only temporary occurrences. On October 1, contrary to his general habit, he was peevish and irritable. In the afternoon he complained of intense headache and vomited several times spontaneously (without having taken food or having had an attack of cough). The night was passed quietly. The following day, headache and vomiting continuing, the child was, by advice of the physician, placed in a dark room with ice to its head. The headache and vomiting ceased, but the boy was kept in the dark room for three days. During

this time he frequently said that he could not see, but the mother attributed this solely to the darkness of the room and did not think it necessary to mention the fact to the attending physician. October 5, the child was taken from the dark room, and it then at once became apparent that he could not see; all its actions were those of a child totally deprived of vision. The condition of the patient when I first saw him on October 8, was as follows: Child well nourished and playing (jumping in bed). No complaints of any nature. Temperature and pulse normal. Heart normal, urine acid, specific gravity 1015. No albumin, no paresis of any muscles; sensation, superficial and deep reflexes normal; hearing and smell normal. The child, however, was totally blind; he was unable to distinguish light from darkness, even when a lighted candle was held close to his eyes. Externally, the eyes were normal, the pupils were of medium size and reacted well to light, the media were clear, and the fundus was normal. This condition of complete blindness unassociated with any other symptom lasted unchanged until October 10, when a rapid change for the better occurred; it was then noted that the child could distinguish objects and count fingers at six feet, but it was also noted that this could only be done when the objects were held upon the left side of the patient. A perimetric examination was not made, but, as the child was a very intelligent one, there was no difficulty in observing, with the aid of a white object against a black board, that well-marked right hemianopsia existed. This condition remained stationary for twenty-four hours, and on the 12th it was not present any more, the child being able to recognize objects at ten feet, although not as well upon the right side as upon the left. Two days later vision was normal for the entire field. Since then the child has remained well.

In what I believe to be a complete survey of the literature of the subject of blindness after or during whooping-cough, the following were the only references which I was able to find: Knapp, in 1874, published a case in which the pupils responded promptly to changes of light, and ophthalmoscopi-

cally an ischæmia retinæ was found. Knapp thinks the ischæmia retinæ was caused by haemorrhagic effusion into the sheaths of the optic nerves, or, more probably, by the general anæmia and weak cardiac action of the patient. The remarks made by Knapp in connection with this case are so interesting that I will reproduce them here. He says: "Blindness is a very rare symptom of whooping-cough. When, on the occasion of a case of that kind, I asked some of my New York colleagues about its occurrence, Prof. Loomis told me that blindness in whooping-cough had been observed, but almost exclusively in children who afterward died from lobular pneumonia. According to that, blindness in whooping-cough would be an ominous symptom." This patient of Knapp's died in the same manner. Steffen, speaking of whooping-cough, says: "We must also refer to blood stasis, the observation of Sbregoni, according to which a girl æt. 6 is said to have been blind each time during the attack. A year ago I treated a girl æt. 8, who during the attack saw indistinctly, but also, as long as the spasmodic stage lasted, part of the acuity of vision was lost in the intervals of the attacks."

Smith has published a case of severe whooping-cough, chronic broncho-pneumonia, first right then left hemiplegia, failure of vision, unconsciousness, spasmodic respiration, and almost complete general insensibility of the surface, with ultimate recovery. The temperature in this case was subnormal; the pupils were largely dilated, with complete failure to respond to light.

Silex reports the case of a girl a year and three quarters of age who three months before had whooping-cough; also accidental poisoning with morphine; recovery from the effects of the morphine; then a paralysis of the right side and a strabismus divergens of the left eye was noticed. On the fourth day after the accident reflex action of the pupils was present, but approach of the finger did not cause closure of the eyes. On the twelfth day the paralysis had disappeared and the child was conscious; the sight was then tested and it was found to be less than before the accident. Examination three

months later showed that the child did not see objects on its right side. After three months more, recovery took place. Silex believes that in this case there was a haemorrhage in the posterior part of the internal capsule, and explains the transient hemianopsia by pressure on the tractus opticus.

Alexander's two cases, to which I have already referred, are as follows: Boy $\text{æt. } 3$, since July, severe pertussis with long-continued spasmody stage. In August, cerebral symptoms, fever, terror, nocturnus, irritability, lack of playfulness, and frequent vomiting, both spontaneously and upon taking food. On the morning of August 3, the parents observed that the child could not see. A physician noted complete blindness. Alexander saw the patient the same day and found complete bilateral loss of sight; temperature 38.2° C., urine free from albumin, internal organs normal, muscular movements intact; pupils of medium size and reacting well to fixation and to light; media clear and fundus normal, but the central vein seemed somewhat enlarged, the arteries, however, being of normal caliber. Total loss of sight continued, cerebral symptoms increased, twitchings of the extremities supervened, the child became comatose, and, under symptoms of cerebral pressure, death took place after fourteen days.

His next case was still under treatment at the time of publication. A girl had had pertussis, and fourteen days prior to the occurrence of the blindness she complained of headache. About the middle of September the child complained of objects appearing hazy; gradually the sight became more and more affected, and on October 3, Alexander found complete blindness. There were no other symptoms of any kind, and the urine was free from albumin. The child could not see a large flame; both pupils were dilated and rigid, without any reaction to light or to accommodation.

Ophthalmoscopically, neuritis optica bilateralis; both papillæ somewhat swollen, opaque, contours blurred but recognizable. No haemorrhages. Under treatment, first the right and then the left pupil began to react. At the same time the sight improved, and on November 1, fingers could be counted at eight

inches; middle of that month sight was $\frac{17}{20}$, and on the 25th $\frac{17}{20}$; ophthalmoscopically, a retrogression of the neuritis was noticeable; at the time of publication atrophy of the optic nerves had set in, and hope of complete recovery was not warranted.

If we analyze these nine cases we find that only four of them are available for any deductions or generalizations, these four cases being Alexander's and my own. Knapp's case was published at a time when less attention was paid to the significance of the pupillary reaction, so, notwithstanding that in this case the pupils reacted promptly to light, Knapp thought the blindness was due to ischaemia retinæ. The other data given are too sparse to enable us to form an opinion of the case. The reference to Sbregondi's and to Steffen's cases are of value in so far only as they show the occurrence of blindness in whooping-cough. In Smith's case the failure of vision was a part of other severe focal symptoms; the complication of symptoms renders the case uninstructive. Silex's case was unfortunately complicated with poisoning by morphine, and it is, therefore, not possible to say whether the assumed cerebral haemorrhage was due to the whooping-cough or not.

An analysis, however, of Alexander's cases and my own, taken together with the reported cases of blindness after scarlet fever and typhoid, shows us that we are dealing with two kinds of cases—those in which the pupils react to light, and those in which this action is abolished. That in both of these classes we are dealing with some intracranial process there can be no doubt, and the significance of the difference in the pupillary reaction is not to be sought in this direction; it is as an indication to the seat of the process that this difference will serve.

What the exact place is, affection of which abolishes the light reflex, is, if we except the experiments of Mendel, only hypothesis; it is, however, unnecessary for our present purpose to know the precise anatomical location of this place. From reasoning and from experiments we can be certain that this place is situated somewhere in the reflex arc between the op-

ticus and the oculo-motorius; that the place must be sought somewhere in the brain, between the seat of certain fibers of the opticus (pupillary fibers) and the place of origin of the branches of the motor oculi which supply the sphincter iridis. We also know that the reaction of the pupils to light depends upon the uninterrupted conduction from the retina through the opticus to the corpora quadrigemina, and thence through the theoretical connection to the oculo-motorius.

Von Graefe, in the discussion of Ebert's paper, called attention to these facts and to the deductions from them; that, according to the reaction of the pupils, the seat of the causal affection will be retrobulbar, if no reaction of the pupils to light is present; whereas if this reaction is preserved, then the seat of the lesion must be situated at some point between the corpora quadrigemina and the seat of light perception in the brain. The value of this distinction in the location of the process lies in its prognostic significance, for, as von Graefe says, if the pupillary reaction to light is present, then the prognosis as regards recovery of sight is always favorable, excepting, of course, processes of such a nature that death is thereby caused; while, on the other hand, if the reaction of the pupils is lost, the process being retrobulbar, there may be permanent loss of sight. The prognosis of these cases, however, can not be formed from the location of the process alone, but will, also, as in every other affection, depend upon its nature. As in many of these cases recovery has taken place in a very short period of time, we must assume transitory brain process; what this process is, pathologically, has been a matter of some dispute, and is still undecided. Ebert believed the process to consist of an acute transient oedema. Notwithstanding the fact that, neurologically, the term oedema cerebri, whether used as a term explanatory of the cause of death, or whether used *intra vitam* as an explanation of certain symptoms, is to-day, treated with but scant courtesy. I must admit that, in view of my cases, I can not do otherwise than concur in Ebert's opinion. In support of this view, I may be allowed to adduce the following facts:

Transitory bilateral blindness occurs most frequently during or after scarlet fever. In this disease also we most frequently see transitory œdema of the skin, which changes its position from day to day. Also in this disease are patients not uncommonly attacked, while feeling perfectly well, with headache, vomiting, "uræmic convulsions," followed by death within a few hours, and upon autopsy a highly anæmic or highly œdematosus kidney is found; frequently such patients recover as suddenly as they were attacked. Furthermore, in such cases of scarlet fever, cerebral complications are frequent, for which, after death, no explanatory changes can be found except an œdematosus infiltration. Also is it probable, according to the investigations of Traube, Rilliet and Barthez, and others, that the so-called uræmic symptoms in many cases of scarlet fever are due to an œdema of the brain, analogous to the œdema of the kidney, but not in any way dependent upon any kidney affection. Finally, Leichtenstern has observed the following cases of scarlet fever: 1. A case of gradually developing uræmic coma, without any other antecedent uræmic symptoms, which upon autopsy showed only anæmia of the brain with moderate œdema. 2. A case of uræmic hemianopsia in an intelligent boy, following upon severe convulsions. 3. A case of uræmic aphasia without obscuration of the sensorium. From these cases Leichtenstern draws the following deductions: That œdema of the frontal lobes and hydrops ventriculorum produces the so-called uræmic coma; that bilateral uræmic convulsion and uræmic hemiplegia are dependent upon a more intense affection of the cortical motor area or of the motor tract of one hemisphere; that the uræmic headache is dependent upon anæmic irritation, or upon inflammatory œdema of the cerebral membranes; finally, that bilateral uræmia amaurosis with normal pupillary reaction is dependent upon anæmia and œdema of both occipital lobes, while œdema of only one occipital lobe produces the corresponding hemianopsia and that the uræmic amaurosis with absent pupillary reaction is dependent upon an œdema of retrobulbar parts anterior to the corpora quadrigemina, provided that a re-

tinal œdema could not also cause such amaurosis. Leichtenstern does not doubt that unilateral uræmic amaurosis is produced in the way last mentioned.

It is not my intention to enter now upon the question of the pathological diagnosis "œdema cerebri," nor even to maintain the existence of a non-inflammatory form of cerebral œdema, for the reason that neither of these questions are germane to my subject; but this much is certain, from the above cited and from other studies, that the existence of an inflammatory œdema is a positive scientific fact as regards which there ought to-day not to be any doubt, notwithstanding all assertions to the contrary. As Huguenin has clearly stated, the only question upon which there can be any difference of opinion is as to what we should consider an œdema, but that if we look upon the term œdema as synonymous with encephalitis, then in the majority of instances we will be clear in our ideas. Of course, the question of inflammatory œdema after acute diseases is one which is still surrounded by darkness; but it seems to me that even in these cases the mode of production is not difficult to understand, if we are willing to admit that the inflammatory œdema here is caused by direct action of infectious material. It is not difficult to conceive how, in whooping cough, the direct action of the *Bacillus pertussis* (Dolan, Burger, Schwenker) can produce these results; neither can any argument against this reasoning be found in the results obtained from post-mortem examinations of the brain and meninges in ordinary cases of pertussis, or in such autopsies injection and enlargement of the vessels, with cerebral engorgement and ventricular effusion, are found, but signs of softening are wanting. The vessels of the membranes, not only of the brain but of the cord as well, are also found in this condition.

Having thus specified the position which I take in regard to this question, I am now able to briefly discuss the significance of my cases. The first case—with the sudden onset of total blindness, with rigidity of the pupils and slight retinal changes, with rapid re-establishment of the light reflex and vision in

the left eye, together with complete restoration of vision and disappearance of all ophthalmoscopic changes in the retina in less than two weeks, all of which occurred without any other cerebral symptom whatever—can not possibly be understood in any other way than by the assumption of a cerebral œdema. Whether this œdema was retrobulbar alone, or also occupied a place between the corpora quadrigemina and the occipital lobes, can not be positively answered. On account of the re-establishment of the pupillary action to light inside twenty-four hours, it would seem that the œdema anterior to the corpora quadrigemina must have been rapidly but unequally absorbed. As the re-establishment of the reaction to light was accompanied by re-establishment of vision and disappearance of retinal changes, it is probable that the entire œdema was situated anteriorly to the corpora quadrigemina. A question which I was unable to solve, and would be of importance in this connection, is whether the pupillary reaction set in before a return of vision took place. To me it seemed as though both occurrences took place at the same time, although, on account of the rapidity of the amelioration, it is impossible for me to express myself upon this point with any degree of certainty.

The second case is, if anything, even still clearer. This child had marked symptoms of a cerebral type, followed by blindness with retained reaction of the pupils to light, followed first by hemianopsia and then by gradual restoration of perfect vision, the entire period covered by these symptoms being but twelve days. The case throughout was precisely like those which occur in scarlet fever and which are termed "uræmic," except that here there was at no time any question of kidney disorder. What other affection than an œdema—at first implicating both occipital lobes, and then, as absorption set in, limited, for a short time only it is true, to one occipital lobe—can explain this case I am unable to see.

Alexander also believed that in his first case there must have been an œdema between the region of the corpora quadrigemina and the occipital lobes, and the recovery of vision was pre-

vented only by the extension of the œdema to parts affection of which made a prolongation of life impossible. His second case was in many ways similar to my first, and I am unable to appreciate his reasons for making a diagnosis of meningitis in this case.

In whatsoever manner we may look upon the pathological sides of these cases, we must not overlook the practical lessons they teach us; that in whooping-cough, as well as in other acute diseases, sudden transitory blindness may occur, and, what is more important, that children so afflicted do not all die, but may recover, and with re-establishment of perfect vision.

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BLEPHAROCHEILOPLASTIC OPERATIONS.¹

BY ARTHUR BENSON, F.R.C.S.I.,

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Two years ago I brought before the Ophthalmological Section of the British Medical Association (Glasgow meeting) the subject of entropion and trichiasis, with special reference to the operative measures for their cure. I would not again venture to bring the subject forward in any form but that I have received so many letters from different ophthalmic surgeons asking for further information regarding the operation of transplanting mucous membrane from the mouth to the eyelids.

In Ireland, where granular ophthalmia and, consequently, entropion and trichiasis are so common, we have such a large field for testing the value of any operation of the sort, that it is natural we should try various modifications in the details as in the larger features of the method. The operation, as at present performed at St. Mark's Ophthalmic Hospital, is what I purpose describing, and I shall not delay to mention the various modifications by which it reached its present form. It will be obvious to anyone who cares to compare the two that the details differ materially from those described by Van Millingen in the *Ophthalmic Review*, vol. vi, p. 309.

The operation is of necessity a somewhat tedious one, and simplicity of manipulation has always been our endeavor. "The St. Mark's Hospital operation" consists in:

1. Splitting the affected lid along the whole length of its free border with a small scalpel, or a broad cutting needle, or a Beer's knife. The incision must be made so that all the

¹Read in the Section of Ophthalmology at the Annual Meeting of the British Medical Association held in Birmingham, July, 1890.

cilia, both normal and abnormal, are in the anterior or skin flap, and all the conjunctiva is in the posterior flap. The making of this incision is by far the most difficult and important part of the operation. It is best accomplished by using Knapp's modification of Snellen's clamp, and the larger the instrument that can be inserted into the palpebral aperture the better will be the result. By using the clamp all haemorrhage is prevented during the operation, and the line of the incision can be accurately made so as to avoid the hair bulbs in the lid, and also the depth of the incision can be more easily estimated. The incision should run obliquely through the tarsus, and extend into the subcutaneous tissue of the lid, otherwise the wound does not gape freely and the transplanted flap is squeezed out of its place by the rigid lips of the incision.

Before considering the section complete it is advisable to use a pair of fairly fine-bladed scissors along the incision, so as to completely divide any remnants of the tarsus that escaped the scapel. The splitting of the lid being now completed, the clamp is not removed, but a pedge of cotton-wool, wet in boric lotion, is laid over it. Another large clamp is then taken and applied to the lip—upper or lower, according to taste—and screwed tightly down. The lip being then everted, two parallel incisions are made the full length of the incision in the lid, and from 3 to 5 millimeters, or even 6 millimeters, apart, if the deformity to be corrected is very great.

These incisions converge rapidly at each end, so as to leave pointed extremities to the flap, which is then dissected up with a pair of scissors. The worm-like flap of mucous membrane so obtained is then turned, with its submucous surface upward, upon the operator's left hand, and the submucous fat and areolar tissue removed with the scissors.

While this is being done by the operator, an assistant puts in a couple of sutures loosely into the lip wound, and then, removing the clamp, these are brought together. This is by no means essential, but facilitates the healing of the lip. Pressure is then kept up on the lip by an assistant who uses a pedge of boric wool over the wound for the purpose.

When the flap is freed from its fat, etc., a fine waxed silk suture is passed through, close to its pointed extremity, from mucous to raw surface; the needle is then passed through the lid at the angle of the incision, from raw surface to lid border, and tied into position. By making a large knot on the suture a few inches from its end, the point of the flap can be drawn closely into the angle of the incision and kept in close apposition with it. Another similar suture is applied to the other end, and two, three or four sutures are used to keep the edges of the flap in close apposition with the lips of the lid wound.

These sutures are not absolutely essential, but our experience shows that they do no harm whatever, and greatly add to the security of the flap in its proper position and the consequent certainty with which it lives in every part.

When the flap is fixed in position, with as many sutures as the operator cares to use (I generally apply six together) the clamp is unscrewed. The operation up to that had been practically bloodless, but the moment the clamp is removed a very brisk haemorrhage ensues, which, but for the sutures, would undoubtedly displace the flap. Pledgets of cotton wadding, wet with boric lotion, applied over the lids, speedily cause the haemorrhage to diminish, and soon to cease altogether.

At first we had apprehensions as to the consequences of leaving the clots that form about the wound, fearing they would interfere with the vitality of the transplanted flap; but here again experience proved our fears to be groundless. In no case (though I have seen some with very severe and long continued haemorrhage) can I remember to have seen trouble from this cause.

When the bleeding has been fairly well abated, a dressing of iodoform ointment on lint, and wet boric wool over it, is applied to the eye; a small portion of oil silk and some dry cotton wool is placed over this, and the whole is kept in position by a light bandage. This dressing is reapplied night and morning. The sutures are removed after three or four days (or sooner, if there is any reason for so doing), and soon after the sutures are removed the bandage is left off.

The changes in color which the transplanted flap undergoes are remarkable. When first transplanted it is almost white and utterly bloodless. After twenty-four hours it turns a peculiar dark, almost black red, like an old blood clot, and in another twenty-four it becomes a bright healthy looking pink color, which it retains for ever after.

The advantages of this operation over all that preceded it for the cure of entropion and trichiasis are too obvious, and have been too often stated to make any repetition of them by me necessary.

Our experience at St. Mark's Hospital is very large in the class of cases that require this operation, and I can state without fear of contradiction, that no other operation has ever given us at all the same perfection and permanence of result as we have obtained by the blepharocheiloplastie operation.

—*Brit. Med. Jour.*

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ORIGINAL ARTICLES.

MY CONNECTION WITH THE ALLEGED CASE
OF MIRACULOUS CURE OF SISTER
MARY PHILOMENA.

BY ADOLF ALT, M.D., ST. LOUIS.

For some weeks my attention has been repeatedly drawn to a newspaper item, in which I was at first simply named as a physician who had seen the case before the miracle, whilst now it even claims that I bear witness to the *miraculous* cure of a nun at the Convent of the Visitation in the City of St. Louis. Being absolutely innocent in the matter in every direction, and feeling sure that my record would not allow the affair to be credited as coming from me, I remained silent. I hoped, in this manner, the thing would die a natural death. However, while looking through my exchanges, I just now stumbled over the sweet expressions of Chicago professional courtesy with which the Editors of the *North American Practitioner*, the Journal of the Post-Graduate School of Chicago, take a hold of a newspaper item without ever troubling themselves with regard to its truth, in the following manner:

"The low status of the science of medicine in St. Louis is evidenced by the following clipping from a daily paper of this city:

"*St. Louis, Mo., April 12.—The Sisters of the Visitation report a miracle which was performed in their midst last Thursday morning. For the last five years Sister Mary Philomena has suffered from what was believed to be an abscess that threatened final injury to the brain. She bled from the nostrils, eyes and ears for hours. Partial blindness resulted from these attacks. Recently Dr. Adolf Alt gave up all hope of recovery unless an operation was performed. The sister was given the right to choose for herself. Her decision was that before she would submit to an operation she would ask that "novenas" be said to the blessed Sister Mary Margaret in her behalf. She did not ask for prayers for her recovery, but simply that 'God's will be made plain to her.'*

Tuesday morning Sister Baptista visited the sick nun in her cell and offered up a "novena" in private prayer. She also gave her a relic, a piece of linen worn by Sister Mary Margaret hundreds of years ago, and a phial of holy water with which to bathe her bleeding eyes. In a paroxysm of pain Wednesday night Sister Philomena swallowed the blessed relic. When she awoke Thursday she felt a strange pricking just above her left eye. Lifting her hand to the spot she felt a metallic substance, which she grasped and pulled out. It was a needle, and transfixed on its point was the linen relic that the sister had swallowed the night before. The truth of this marvelous miracle is vouched for by Dr. Alt and the Mother Superior. How the needle ever entered or reached the place where it was found is unknown."

"When the St. Louis doctors have to call in the saints to their aid things must be in a truly desperate condition.

The whole affair reminds us of the miraculous thoracocentesis performed on the prophet Mohamed at a tender age. The Arab historians state that while he and his foster brother, Masroud, were playing together they were disconcerted and startled by the appearance of two angels who laid Mohamed

on the ground and one of them, the Archangel Gabriel, opened his thorax and, taking out his heart, squeezed therefrom the remnants of original sin inherited from our forefather, Adam, in the shape of sundry black drops, after which, replacing the organ in this aseptic condition, they winged their way aloft."

My answer to this—and I hope the gentlemen who so kindly spread the newspaper article will also spread my answer in the same manner—is, that it is a base fabrication of somebody's brain, who thought he was either doing me a particular good or a particular harm by it. The following are the facts:

On April 4, last, I was called by a letter of the Mother Superior to see a Sister who was said to be suffering greatly. When I saw the patient I was told that she had on that day bled profusely from the left eye without provocation.

I found a red upper eyelid, as if it had been rubbed, and a slight photophobia, but nothing else. I told the mother that I could not find anything for which my services might be of any use. According to the Sister's story, I presumed that she was afflicted with haemophilia, as she was stated to have bled from different parts at slight provocation or without it.

This is all I know of the miracle case. I saw the Sister only that once. I did not do anything for her. I had nothing to do with the subsequent alleged miracle and could, therefore, not vouch for it, even if I believed it.

I hope this statement will help to put the weary brains to rest, as far as I am concerned, in a matter as foreign to me as the man in the moon.

A CASE OF ROUND CELL SARCOMA OF THE ORBIT RESULTING IN DEATH.

• BY DAVID WEBSTER, M. D., NEW YORK,

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Mr. Albert B., æt. 21, a native and resident of Canada, and by occupation a school-teacher, came to Dr. C. R. Agnew on April 6, 1874, with a letter from Dr. Howard, of Montreal, a part of which I quote *verbatim*. "March 31, 1874. Mr. B. presented himself to me in the beginning of January last with a tumor of the lachrymal gland which had displaced the eyeball downward and very much forward. There was very great congestion of the minute blood-vessels of the retina, enlarged and dilated retinal veins, with marked congestion of the optic disk and impairment of vision. I removed the growth on January 10 last. It was the size of a medium-sized horse chestnut, and encroached a good deal upon the eyeball from which, however, and from its deeper relations, it was easily removed by careful dissection and enucleation. It proved to be a hypertrophied lachrymal gland. Suppuration of the cavity left by its removal followed, with a great deal of infiltration of the upper eyelid, with inflammatory products, and ptosis. As I could not satisfy myself as to how much of the latter was due to inflammatory thickening and how much actual division of the levator muscle, I advised him to return in two months for the purpose of examination as to the need of interfering surgically for the removal of the ptosis. He presented himself to-day in the condition in which you find him, and as I think there was a reproduction of the growth, I have advised him to get the benefit of your large experience."

The patient states that he first noticed protrusion of the right eye on November 20, 1873. There has never been any pain in or about the eye. The patient solemnly affirms that he was unable to distinguish light from dark with either eye

for three days after Dr. Howard removed the growth. There is now complete ptosis. The patient can turn the eye slightly inward and outward, but not at all up or down. The eyeball is pressed forward about half an inch by a growth posterior to it. (L.V.= $20/_{xx}$, and normal). R.V.= $20/_{cc}$, and vision not improved by glasses. The ciliary region is injected. The ophthalmoscope shows choked disk. The disk is hypermetropic about $1/_{12}$ while toward the periphery of the retina the eye is emmetropic. The retinal veins in the neighborhood of the disk are enlarged and exceedingly tortuous. There are some small retinal exudations of lymph, but no haemorrhage. The patient says that the vision has been steadily failing for the last two weeks.

On April 9, I gave the patient ether and Dr. Agnew operated. The eyeball was first enucleated after the usual manner. Then, a tumor could be felt, by the finger, filling up the orbit. This was dissected out with scissors far back into the orbit, and still the remaining substance, filling up the very apex of the orbit, felt like neoplastic growth to the touch. The bleeding was considerable, and was controlled by the powdered, dry persulphate of iron. The orbit was stuffed with a sponge covered with the powdered persulphate, lint was packed over this, and a bandage applied over all. The patient took six ounces of ether, and began to vomit soon after the operation was finished.

April 14.—The patient has had no pain and taken no anodyne, and for the first time this morning the upper lid is considerably swollen.

8 P.M.—Both eyelids are a good deal swollen, red, and somewhat tense. There is very little discharge from the orbit. The patient seems weak, and breathes with his mouth open, and with a kind of panting respiration. Pulse 120; temperature 103° . Rx Liq. ammon. acetat., 5ss every three hours. 11 P.M., pulse 110; temperature $102^{1/2}^{\circ}$.

April 15, 9 A.M.—Pulse 115; temperature $102^{5/20}$. Continued the same treatment.

April 16, 9 A.M.—Pulse 110; temperature 105° . The case is

now evidently one of erysipelas and the swelling has extended to the cheek and brow, across the nose, and has involved the lids of the left eye, and also the left ear. The patient was put upon whisky and liq. ammon. acetat., aa 5ss, every three hours, and tincture of chloride of iron fifteen minims every three hours. Also, the swollen parts were kept wet with acetate of lead and opium wash.

April 17.—The patient seems better generally, but complains that the "cords of his neck" are sore. Pulse 95; temperature 103°. Took half an ounce of Rochelle salts last night and had six liquid stools.

April 18, 9 A.M.—Pulse 90; temperature 104°. The patient is to leave off the liq. ammon. acetat., and continue the other treatment.

April 21, 9 A.M.—Pulse 80; temperature 100°. Patient feeling much better. Left ear still slightly red and swollen.

April 24.—The swelling has all disappeared and the pulse about normal. The patient was allowed to return to his home. The orbital growth recurred within six weeks. We heard from him frequently, by letter, detailing the progress of the growth, until he died, apparently from exhaustion, on January 22, 1875. At the time of his death, the tumor, protruding from the orbit, measured twenty-two inches in circumference. There was no autopsy.

The tumor, removed from his orbit by Dr. C. R. Agnew, was given to the late Dr. William E. Hall for examination. He reported as follows: "April 14, 1874. The tumor presented for examination was soft, pale red, and by expression yielded a whitish juice, composed of medium-sized, round, granular cells and free fat globules.

Upon section, round, granular, fatty cells with scanty, granular "intercellular" matter, and free fat globules in great abundance. No fusiform cells, nor any evidence of fibrillation presented. The cells present a uniformly elementary character, much resembling granulation tissue cells. In my opinion the tumor is a round cell sarcoma, undergoing fatty degeneration."

DISLOCATION OF THE LENS INTO THE ANTERIOR CHAMBER.¹

BY BERNIE BETTMAN, M.D.,

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Becker² found, in collecting the statistics of eye diseases, treated for a series of years in some of the principal clinics in Europe and this country, in all about 65,000 patients, that diseases of the lens contribute from 5 to 6% of the total number of cases. Furthermore, the various forms of cataract constitute more than 90% of these different diseases of the lens, so we can readily see that dislocations of the lens into the anterior chamber is an extremely rare occurrence.

In the interesting statistics referred to above, I find that in 21,586 cases dislocatio lentis occurs but 37 times. In the second table amongst 129,414 cases of eye disease observed in European and American clinics during a period of from 2 to 10 years, dislocatio lentis was noticed but 103 times. The percentage of dislocatio lentis is consequently less than $\frac{1}{8}$ of 1%. These tables also refer to 47 cases included in the category of ectopia lentis and luxatio lentis and even if these are added to the heading of dislocated lenses, our percentage would not be materially increased.

We must also remember that the terms dislocatio and luxatio lentis include all the various malpositions of the lens, from a slight tilting beyond the equatorial plane to a complete re-

¹Read before the Chicago Medical Society, April 20, 1891.

²Graefe u. Sämisch Handb. d. Gesammten Augenheilkunde, V, Band I.

moval from the fossa patellaris either into the vitreous, anterior chamber, or through a rent in the sclera under the conjunctiva.

During a hospital and private experience of 13 years in this city, and in the celebrated clinics of Europe, I have met with but two cases of luxatio lentis into the anterior chamber. The first case, to which I will refer later on, I observed while serving as first assistant to Prof. Becker, in the eye clinic of Heidelberg. It may be classified under the head of spontaneous dislocation, the lens having been opaque and shrunken for a period of years. The second case I saw during my service at the Cook County Hospital and is practically the only pronounced case of traumatic dislocated lens into the anterior chamber which has come under my observation. The lens enclosed in its capsule is suspended between the aqueous and vitreous humors by the suspensory ligament, or zonula Zinnii, as it is also termed. This transparent thin membrane is again attached to the ciliary body and is made tense or slack, according to the relaxation and contraction of the ciliary muscle, constituting what is known as the act of accommodation. If perchance the zonula Zinnii is partially torn or entirely severed from its attachment, the lens is thrown out of its normal position and is then sub-luxated or entirely dislocated.

This partial or complete removal of the lens from its position can be either spontaneous or traumatic.

Traumatic luxation is due either to the concussion of the eye, where the outer coverings remain intact, or it can result from the penetration of a foreign body into the eye; again it can be secondary, resulting from an ulceration and perforation of the cornea. Consequently Becker distinguishes three forms of this anomaly:

Spontaneous luxation.

Traumatic luxation.

Secondary luxation.

Spontaneous luxations occur in the great majority of cases as the result of over-ripe senile cataracts.

It must be assumed that the zonula Zinnii is either dissolved

or becomes detached from the lens, owing to the contractile changes instituted by capsular cataract. The modus operandi is explained in the following manner: After a lens has matured, its aqueous portion is absorbed and the lenticular body decreases in volume. Its fibres are torn loose from the posterior surface of the anterior capsule, to be followed by proliferation of its epithelia and the formation of capsular cataract. The subsequent changes are contraction of the anterior capsule, tension on the zonula and partial or complete tearing of the latter. Any slight shock or jarring of the body, violent exertion, a blow on the head or eye, vomiting or any other strain is now sufficient to displace the lens partially or entirely into the chambers of the eye.

Prof. Becker¹ bases this theory on the fact that "spontaneously luxated cataractous lenses always exhibit extensive capsular cataract, and furthermore, that all lenses extracted in their capsules during a cataract operation, never show any trace of the zonula on their anterior capsule. This indicates that the connection is severed directly at the capsule, and not in the continuity of the zonula."

During the summer of 1880 a shoemaker from the Palatinate was admitted into the eye clinic of the University of Heidelberg. He was perhaps 35 years old, and stated that his right eye had been injured during childhood. Soon after the injury his parents noticed the formation of a white object in the pupil. He observed it himself later on in life, and also noticed that its appearance gradually changed. As the years went by the change in color from white to yellow especially impressed him. A week before his admission into the clinic he was disturbed by a feeling of uneasiness and irritability of the right eye. On looking into a mirror he discovered that the yellow body had changed its position from behind the colored part of the eye to a place in front of it.

On examination I found corneal injection, the anterior chamber contained a round, shrunken, yellow capsular cataract,

¹Loc. Cit., p. 291.

its lower part concealed the iris from view, above its upper edge a slit of the pupil was visible. On inquiry I elicited the statement that the patient had not received a direct blow on the eye, neither had he fallen nor sustained a shock in any other way. He remembered, however, on further questioning, having struck his right eye a slight blow with his awl a few days prior to the irritable condition.

After the instillation of eserine, which induced contraction of the pupil and prevented the lens from escaping into the vitreous chamber, I removed the foreign body through a lower corneal incision.

The operation was not accompanied by any unusual occurrence, neither was there a prolapsus of the iris or vitreous. Recovery was rapid, the patient being soon discharged with a round black pupil.

The extracted lens was flattened and quite consistent, it presented a homogenous yellowish white color. It was placed in Mueller's fluid and became a part of the valuable collection gathered by my friend and teacher Prof. Otto Becker.

The concussion of the eye produced by the awl was so slight that it had almost escaped the patient's memory it served doubtless to complete the detachment of the lens from the suspensory ligament which had already existed in part. The position of the shoemaker bending over his work facilitated the dislodgment of the freed lens into the anterior chamber.

Traumatic dislocation of the lens is due, as I have already indicated, to a concussion of the globe. Offending bodies capable of producing such effects usually impinge upon the lower outer quadrant of the eye or bony orbit, since the organ of sight is partially protected on its inner and upper sides by the nose and overhanging orbital plate of the frontal bone.

The force of the injury flattens the anterior portion of the eyeball, diminishes its antero-posterior diameter and increases the equatorial one. The lens, owing to its suspended condition and greater weight, oscillates backward and forward, pulls and tears the zonula Zinnii and thus leaves its normal position.

The connection between the lens capsule and vitreous is so firm that in a fresh specimen one cannot be removed from the other.¹

In the senile state changes ensue affecting the elasticity, not only of the zonula Zinnii, but of the lens capsule also. Overripe cataracts are frequently removed encapsulated, and are not accompanied by an escape or protrusion of vitreous, showing conclusively that the connection between the lens and vitreous can be separated without a break in continuity of the enveloping structure of the vitreous. Not only opaque lenses, but perfectly transparent ones, are liable to be dislodged.

Frank C., æt. 60, upon admission into the Cook County Hospital late in October, 1890, stated that he had been struck in the left eye, about four weeks previously, by a stiff, hard boxing glove. The pain was quite severe; the injury was immediately followed by dimness of vision.

Severe circum-orbital pain ensued, vision gradually failed until, ten days prior to his admission, he could no longer distinguish objects, *status præsens*, left eye, intense ciliary injection. The cornea smooth and clear throughout. The anterior chamber almost completely filled with an opaque grayish body, circular in outline. Its inner border hidden behind the sclero-corneal margin, but its outer edge free, beyond which the iris is dimly seen. Tension increased. +T. 2. The right eye normal. Patient complains of ocular and radiating pains. October 24, 1890, I placed the patient under the influence of chloroform, the corneal incision was made upward, no iridectomy was done. I made the peripheric capsulotomy and evacuated the soft swollen lens mass with greatest ease. Some transparent cortical substance remained behind. I made no further attempt to remove it, owing to the protrusion of a small bead of vitreous. This I snipped off and reduced the prolapsed iris with a spatula. Eserine having been instilled, a pressure bandage was applied and the patient put to bed.

October 26 a small prolapsus of the iris was visible in the

¹Merkel, L. C., vol. i, Band 1.

inner border of the wound. The wound had not closed, the eye otherwise looked well, patient was able to count my fingers.

November 4 the supply of eserine in the hospital had run out; no more being procurable pilocarpine was substituted. The wound gradually healed with a very small prolapsus of the iris incarcerated in the cicatrix, the pupil was drawn upward, but free and black, ciliary injection was limited to the uppermost quadrant of the eye. Vision good. Patient was very weak and complained of pain in the epigastrium, accompanied by vomiting; bowels constipated.

November 10, 7 P.M., the house surgeon was suddenly called to the patient, and found him in a state of collapse with no pulse at the wrist; his condition could not be attributed to any cause. Death ensued at 8:45 P.M. Post-mortem: Stomach was much thickened; weight, 19 ounces. Peritoneal cavity contained about $\frac{1}{2}$ pint of a bloody fluid.

Intestines showed minute haemorrhage in their walls. Kidneys were contracted. I learned later on from the nurse that she suspected the patient had poisoned himself.

TREATMENT OF IMMATURE CATARACT.

INCLUDING (a) THE REPORT OF TWENTY-FIVE EXTRACTIONS OF
IMMATURE CATARACT, AND (b) A REVIEW OF VARIOUS
MODES OF ARTIFICIALLY MATURING THE
SLOWLY-FORMING CATARACT.

BY JOHN F. FULTON, M.D., PH. D.,

Professor of Ophthalmology and Otology in the University of Minnesota.

With our present mode of removing mature senile cataracts every ophthalmic surgeon may be well satisfied. The success in recent times which our profession has achieved in this direction is probably one of the most brilliant triumphs of modern science, and will be so recorded in the pages of the scientific history of the last few decades. In fact, to lose a case of uncomplicated mature senile cataract is now looked upon with suspicion, indicating that proper care has not been exercised either in the operation or the after-treatment by the surgeon or some of his attendants. This is truly marvelous when we consider that it is but a few years since every surgeon would lose at least 15% of his cases from suppuration of the cornea. But the progress of modern science knows no limit, but, with feverish avidity, strives after more refined diagnosis, more accurate remedies, and more satisfactory methods in surgery. For many years one of the most unsatisfactory classes of cases that came under the care of the ophthalmic surgeon was that class of cataracts known as immature, which required not only many months, but frequently many years, to mature after the patients' sight became so blurred that they were no longer able to read or perform the ordinary vocations

of life. It is to this class of cases that I wish to invite your attention in this paper. Every one present can recall many cases which endured prolonged hardships by having this form of cataract, which for years we did not feel justified in interfering with, as the most conservative of our profession in former years, and even many at the present time, could only advise such patients to wait until they became quite blind before any thing could be done. Such patients, often became weary of the prolonged and tedious wait, and naturally would drift into the hands of unscrupulous pretenders, who would rob them of their already limited financial resources.

Antiseptic surgery gave to our profession greater confidence in the resources of our art, so that which was looked upon for many years as hazardous or unjustifiable, has been attempted and found to be practicable and successful, namely: The removal of partially opaque cataract by means of simple extraction. It can be no longer looked upon as inexpedient to attempt to extract a lens, although there may be extensive layers of transparent tissue intervening between the opaque or partially opaque nucleus and the capsule of the lens. It is interesting to us to remember that it was Von Graefe himself who took the first step in this direction, when he advises that in cases where one lens was successfully removed the surgeon should "proceed boldly with the second."

By immature cataract, of course, we mean that form of cataract where portions of the nucleus of the cortical substance remain transparent, where there is not complete opacification of the whole of the lens structure, a form of trouble which is frequently associated with other diseases of the eye, especially diseases of the background, thus interfering with the percentage of successes or perfect results. Probably the best test in differentiating the maturity of cataract from immaturity is the ophthalmoscope. In the immature we always get more or less of a reddish reflex from the background. Formerly it was taught that in mature cataract the iris would not cast a shadow against the lens, but it was long ago pointed out by Forster that "there are cataracts which have been mature for

years in which the iris, however, still throws a shadow, and the dilated pupil is more or less illuminable by the ophthalmoscope, while, on the contrary, there are cases of immature cataract in which the iris does not throw a shadow on the lens, nor does the dilated pupil give the slightest red reflex from the fundus of the eye when illuminated with the ophthalmoscope."

In a majority of the immature or slowly-forming cataracts the opaque cortical substance is divided off into well-marked sectors, with transparent sectors intervening. This transparent material is usually adherent, and the capsule remains behind after extraction of the lens, unless unusual precautions are taken to remove it; being transparent at the time of the extraction, it cannot be seen, but becomes opaque and blocks up the pupil on the following day. This transparent material may be adherent either to the posterior or anterior capsule, although the posterior cortex is generally much thinner than the anterior.

Various artificial processes have been resorted to in order to bring about ripening of the cataract. Puncturing the anterior capsule by means of needles has been faithfully tried, but was not sufficiently encouraging to be continued. In fact, clinical experience has proven this to be a dangerous procedure. The lens at times will swell very rapidly, bringing on traumatic glaucoma, resulting only too frequently in the destruction of sight; although if a surgeon lives in the same building with the patient this can be accomplished with considerable degree of success. Preliminary iridectomy was for a time recommended, and is still resorted to by some surgeons. It was noticed by Snellen, and also by Forster, that iridectomy occasionally hastened the maturity of cataracts. It occurred to Forster that this was caused by the alteration in the form to which the lens is subjected by being pushed forward after the escape of aqueous humor; the connection between the opaque and transparent fibres of the cataract being loosened and the degeneration of the cordical layer thus hastened; he consequently recommended rubbing the cornea with a strabismus hook or some such instrument after the iridectomy.

was done for the purpose of hastening the maturation. This, however, has proved to be equally unsatisfactory. In my experience it is a very rare exception for the operation to be successful, and is attended with some danger. I have, myself, seen two eyes that were lost in consequence of an irido-cyclitis, which took place in consequence of this insignificant operation; so, encouraged by the successful cases reported by Mr. Tweedy, Dr. McKeown, and others, I commenced extracting immature cataracts just as soon as the patient was no longer able to follow his vocation, in consequence of his defective sight. I have operated upon twenty-five cases, all without iridectomy, in the manner described below:

I make a somewhat larger section of the cornea than I do for senile cataract; also make a large section of the capsule by means of a cystotome, corresponding to the section made in the cornea. The reason of making so large an opening is to facilitate the exit of the swollen lens, together with as much of the cortical substance as possible. In all cases where the iris remained prolapsed after the lens was extracted I washed out the anterior chamber, together with the cavity of the capsule, with a 2% solution of boracic acid, the solution being made in distilled water, and made milk-warm at the time it was used. The syringe which I used was the ordinary lachrymal syringe. I did not use the syringe in those cases where the iris went back into the anterior chamber immediately after extraction, although in the future I shall have no hesitation in pulling the iris out by means of a blunt hook, and thus wash out freely the interior of the capsule, being encouraged to do this by the fact that the cases which I did wash out had less subsequent trouble in the way of iritis and general irritation of the eye than those in which I refrained from so doing; also by the fact that I have twice been compelled to pull the iris outside of the eyeball in order to disentangle a foreign body from its meshes, and place this delicate membrane *in situ* again, without having any subsequent iritis. This, of course, was for the purpose of washing out any cortical substance that may remain in the lens capsule, as well as to give additional anti-

septic precautions, the instruments all being boiled before each operation, placed in a saturated solution of boracic acid immediately afterward, and each instrument passed through an alcohol blaze before it touched the eye. Many of the patients, however, were operated upon in my office, and permitted to drive several miles after the operation; none were kept in bed after the operation, and a bandage never was kept on the eye longer than four days, and most frequently only for twenty-four or forty-eight hours, my rule being to remove the bandage as soon as the edges of the wound become adherent and the anterior chamber fills up. Eserine was always used until the anterior chamber became established, after which I immediately changed from eserine to atropine.

Capsulitis is much more apt to take place after the extraction of mature cataract, consequently it is necessary to do a secondary operation more frequently. I have looked over and carefully estimated the statistics of a great many of the reported cases of senile cataract, and find that it is necessary to do a capsulotomy in about 50% of the cases. Of the 25 cases of immature cataract which I have operated upon, capsulitis, resulting in secondary cataract, formed in 18, rendering it necessary to do a capsulotomy in 18 out of the 25. The visual results obtained were very good, $20/_{XXX}$ being obtained in 6, $20/_{XL}$ in 10, $20/_{LX}$ in 4, $20/_{LXXX}$ in 3, $20/_{CC}$ in 2. In one of the cases in which a vision of $20/_{CC}$ was obtained, the case was complicated by choroiditis, and in the other by a fluid vitreous. Three of the cases operated upon were of advanced age; one, a physician, æt. 89, whose cataract had been forming for seven years upon the eye upon which I operated; he had been unable to read for three years. The ophthalmoscope showed a cataractous lens, with quite a large reflex; the lens was sufficiently cataractous, however, so that no outlines of the background could be made out. The extraction was done without accident, and the healing process was uninterrupted, the bandage being used only for forty-eight hours. It was a gratification to meet this aged gentleman, a few months later, at the State Medical Society of South Dakota, reading a paper upon some

scientific subject. His vision after the extraction being $^{20}/_{\text{xxx}}$, and with the proper correcting glass, he was able to read the finest print.

Another case, worthy of note, was a lady, æt. 92, who was blind in one eye, due to disease of the background, and the cataract in the right eye had been forming for ten years. She was referred to me by Dr. Moore, of Spring Valley. In addition to the trouble with her eyes, she was a cripple, with rheumatoid arthritis, in consequence of which it was necessary for her to be carried to the hospital. The result in this case was equally satisfactory with that of the one recorded above.

The youngest person operated upon was 32 years of age, the oldest, 92. All cases were done without iridectomy; all but two got well with central pupils without serious posterior synechiae. In two there was secondary prolapse of the iris; in one the iris prolapsed the second day, in the other the third day; both were restless patients, and I think the prolapse was due to traumatism applied by the fingers of the patients. The prolapsed iris was not interfered with in either case, and both made excellent recoveries.

If atropine is used and the pupil kept well dilated as soon as the anterior chamber fills up, in my experience the iritis can be always kept under control. In only two cases of the twenty-five operated upon did the iritis assume a dangerous form, and this was in the persons of nervous patients who could not be controlled at the time of the operation, and in consequence of their nervousness I was not able to get out but very little of the cortical substance. I have repeatedly seen just as bad iritis after a perfectly normal senile extraction. The rule which I wish to emphasize is to commence the use of the atropine, eight grains to the ounce, just as soon as the anterior chamber is filled up.

These cases are reported to show that immature cataract can be successfully extracted without doing an iridectomy, and this class of patients need not be doomed to the prolonged years of waiting and anxiety to which they have been formerly subjected.

METASTATIC ABSCESS AND CELLULITIS OF THE ORBIT, FOLLOWING DOUBLE SUPPURATING CHANCROIDAL BUBOES OF THE IN- GUINAL REGION.¹

BY H. V. WÜRDEMANN, M.D., OF MILWAUKEE, WISCONSIN.

Affections of the eye occurring during the course of constitutional syphilis are of common observance. All the lesions of lues may appear on or in the eye or its appendages. The soft chancre has been observed upon the conjunctiva by several authors,² but other chancroidal lesions are unknown.

Upon examination of all the data I could procure relating to this subject I am unable to find a similar case to the following reported. The cause of idiopathic cellulitis is usually ascribed to a thrombo-phlebitis of the small orbital veins forming a nidus for extension of the inflammation to the surrounding structures. Other cases are caused by periostitis, erysipelas of head or lachrymal disease, or even by metastasis from disease in other organs. The affection is frequently fatal from propagation of the mycotic process to the meninges.

The patient had several chancroidal ulcers of the penis which had been neglected until the occurrence of double buboes of the groin led him to consult Dr. D. J. Hayes, of this city. To the kindness of the latter I am indebted for the reference of the case and for notes on the previous history. The subject was a young Englishman who had lately come over from the old country and who was possibly over confident in

¹Read before the Northwestern Wisconsin Medical Society at Oshkosh, April 14, 1891.

²Hirscher, Wien. Med. Wochenschrift, Nos. 72, 73, 74, 1866. Galezowski, Journ. d'Ophth., 1872.

the cleanliness of our Milwaukee Cyprians. Dr. Hayes first attended him at his boarding place, the room being on the top floor of a tenement, cold and poorly ventilated. The patient was very weak and emaciated from his illness and surroundings. Suppuration had been established on both sides and he was removed to Trinity Hospital, where the diseased glands were carefully opened and cleaned out. The wounds were antiseptically dressed and the applications renewed when necessary. Pus ceased to form after a couple of dressings.

The patient complained that his right eye was troubling him and a few days later the symptoms were quite severe. Dr. Hayes then asked me to take charge of the case and upon examination I found an irido cyclitis which, from the previous history, I judged to have existed about five or six days. The anterior chamber was swollen, and the pupil irregular from the formation of synechiae. There was considerable flocculent deposit in the anterior chamber. The vision was reduced to perception of the hand held before the face and the pain and photophobia were intense. These symptoms became worse and the conjunctiva chemosed to such an extent that the lids could not be closed.

The usual remedies, atropine and hot applications, were used without material effect, the pain only yielding to large doses of morphine hypodermically. The temperature ranged from 101° in the morning to 103° at night. Panophthalmitis set in and at this time, one week from the day I first saw the patient, there was a slight protrusion of the eyeball, it being downward, outward and forward. The patient had marked rigors followed by further elevation of temperature to 105° at night. Scarification of the chemosed conjunctiva and canthotomy was resorted to and gave temporary relief. He was also given quinine in large doses and supportive treatment. The vision at this time was nil. Ten days from the first time I saw him the chills and high temperature also returned and the patient was very much enfeebled. Swelling of the axillary glands was noted and these became quite painful, although they did not suppurate. The patient complained of pain under the clavicle

and swelling was seen in that region. Dr. Hayes tapped this with a hypodermic syringe and drew forth a few drops of serum. This disappeared in a few days without any further attention.

Suspecting pus formation in the orbit I made exploratory incisions through the conjunctiva at the external canthus and through the upper lid down to the apex of the orbit, but with negative findings. In a consultation with Drs. Bach and Hayes, it was decided to await further developments as the patient was very low. Two days later pus presented near the insertion of the external rectus and the eyeball was dislocated from the protrusion. I then enucleated the globe and released a large quantity of pus from a retro-bulbar abscess in the capsule of Tenon.

There was a free discharge of pus for several days after the operation. To our satisfaction the symptoms rapidly improved and the patient was enabled to leave the hospital two weeks later. He rapidly gained in weight and health and bore an artificial eye with comfort about a month afterward. One point of interest here was that the orbit remained so shallow that great difficulty was experienced in fitting the shell. One was finally made to order after a fruitless search among several stocks of many thousands. That which was at last obtained was very wide, short from top to bottom and flat.

In this case there is no doubt but that the primary cause was the venereal disease and that this was chancroidal. During my treatment of the case there were no symptoms that could be referred to syphilis and Dr. Hayes says that it may with certainty be excluded. The man has been under observation for six months since the operation and appears perfectly healthy. I do not claim that the orbital affection was of a chancroidal nature, but I think that this complication was due to the deposition of a mycotic thrombus from one of the other structures more directly implicated, in the orbital veins which caused suppuration and extension of the disease to the other parts. This might have been the liver or other internal organ

or the clot may have been directly transmitted through the venous system. I have heard of such an event happening to the eye after parturition in which the system had become infected and septicæmia had resulted. The systemic symptoms were septic in character and the orbit seemed to be the principal focus of infection, for all dangerous symptoms ceased after the operation and the patient made a rapid recovery.

AMAUROSIS PARTIALIS FUGAX.

BY G. STERLING RYERSON, M.D., C.M.,

Professor of Ophthalmology in Trinity Medical College, Toronto.

My attention has frequently been called to cases of sudden partial loss of sight, unattended by headache or migraine, occurring in persons who either suffer from digestive disorders or who are subjected to much mental worry. These attacks cause the patient great alarm but experience teaches that they are comparatively harmless.

A lesser form of ocular disturbance from mental anxiety is illustrated by the case of a bank manager, who consulted me some years ago.

He stated that after a day of especially protracted anxiety, he would see waves of light, like luminous clouds, passing before his eyes when he was in the dark. They always traveled from right to left. He did not lose his sight at any time. He soon afterward retired from business, and has not been troubled in this way since.

One of the most marked cases which has come under my observation is the following:

Mr. A., æt. 30, a student, consulted me on February 7, 1887, complaining of the following symptoms: In October, 1884, his sight suddenly became blurred and dim. He saw a peculiar bright circle or star. He had had somewhat similar attacks for two or three years before that, but after this attack the sight remained dim for some time. The attacks usually lasted from half an hour to an hour. They came on about once a month. He had no headache either during the attack or after it. Sometimes it was attended by a dull or confused feeling in the head. He had sharp supraorbital pain during the

attack; also a feeling of tightness over the eyes. The "star" or scotoma is sometimes colored. He says it is a sort of spectrum, yellow predominating.

This patient is thin, pale, blue-eyed and dark-haired; is very intelligent; his general health is poor. He is dyspeptic, and has been subjected to much worry. He has no sexual disorders. He has never had syphilis. The family history is good, there being no tendency to nervous disease. The vision is $20'_{xx} +$ in both eyes. Ophthalmoscopic examination gives negative results. He was put on bromide of sodium, thirty grain doses taken at bedtime, and advised to keep it up for a year. I saw him at intervals for 18 months, during which time there was a great improvement in the frequency and the severity of the attacks. I have not heard of him since.

Another patient told me that previous to an attack he would see a brilliant spot before the eyes which would begin to take on a serpentine motion, and when it reached a certain point the sight would "snuff out" in the central portion of the field, and would gradually return in about a quarter of an hour. This appears very much like an *aura*.

Others again say they see colors, generally blue, in the day time, and sparks and flashes of light at night. The field of vision was concentrically contracted in one case, a lady, observed in July, 1889, but in other cases there was no alteration.

In 1878 I was, for a short time, traveling physician to a gentleman, a patient of Dr. Hughlings Jackson, suffering from *petit mal*. One day he exclaimed "my sight is gone." I got my ophthalmoscope as quickly as possible, and examined his eyes. The whole fundus was pale, and there was an irregular jerky pulsation of the veins. It passed off in a very few minutes. The majority of cases I have observed have been in educated people, more often men than women. I have not found sexual irregularities play a prominent part in the causation. Anxiety and worry have always been complained of. The vision between the attacks is good. Photophobia and asthenopia are often met with. The defect in vision is in the center

of the field. In two cases only did I observe hemianopsia. In one case there was a sudden dilatation of the right pupil, the accommodation being unaffected, which lasted a few hours and passed off. In no case have I observed serious deterioration of vision, even after the attacks had recurred for several years.

These cases appear to be epileptiform neuroses, with loss of vaso-motor control. They correspond very closely with the description given by Förster¹, of *Amaurosis partialis fugax*, and to the *Flimmerscotom*, of Listing,² and such I take them to be.

The treatment I have found most satisfactory has been bromide of sodium or potassium in thirty grain doses, once or twice a day, or bromidia, a drachm at bed time. I think I have seen benefit from aurii et sodii chlorid. gr. $\frac{1}{10}$; ext. nucis vom., gr. $\frac{1}{4}$; ft. pil. Dose one twice a day.

It is important to attend to the hepatic function by administering euonymin or calomel, as required. I hardly need add that sexual excesses, undue excitement and overwork should be avoided. The asthenopia may require the proper adjustment of glasses, and I have found benefit in prescribing in these, as well as in other asthenopic cases:

R	Eserin. sulph.,	-	-	-	gr. $\frac{1}{40}$.
	Acid. boric.,	-	-	-	gr. v.
	Aq. distill.,	-	-	-	5j.

Two or three drops to be put in each eye twice daily.

¹Zehender's Monatsblätter, vii, s 422.

²Ibid, v. s. 335.

A CASE OF HÆMORRHAGIC GLAUCOMA—ENCLEATION—REPORT OF CONDITION OF BALL.

BY JOHN DUNN, M. D., RICHMOND, VA.

Mrs. P., æt. 68, had suffered for two years with pain in her right eye; this pain would at times be very severe in the ball itself, sometimes exist as a neuralgia affecting the whole right side of the face; at times remit into a dull pain about the orbital region. At some time in these two years, the patient does not know when, the sight of the right eye became lost, so that not the strongest light flashed into the eye could be perceived. Examination of the eye showed the tension of the ball to be +2, but under very firm pressure to be suggestive of fluid vitreous. The patient remarked that the eye did not hurt when pressed upon, a fact to be wondered at when the condition of the ciliary region is considered. The cornea was clear. There was complete obliteration of the anterior chamber, the iris being everywhere forced against the cornea. The pupil was contracted and irregular, as if it were bound to the lens by inflammatory exudation. Between the iris and the cornea was a small hæmorrhage, apparently of recent origin; the blood, owing to the pressure of the iris against the cornea, had not fallen into the bottom of the anterior chamber, but was suspended just below the pupil. The lens was opaque. The subconjunctival vessels were not noticeably dilated, nor did the condition of the peri-corneal zone point to a marked inflammatory condition in the interior of the eye. The patient's general health was good. The heart sounds pointed to cardiac hypertrophy, while the condition of the arteries at the wrist gave evidence of arterial degeneration. By the afternoon of

the day on which the examination was made, the haemorrhage in the anterior chamber had so increased that it concealed from view the pupil and the adjacent, perhaps, one-sixth of the iris. Though a troublesome haemorrhage from the stump was expected, under cocaine and a partial chloroform narcosis the eye was removed the same afternoon. For a few moments after the enucleation there was the usual flow of blood, very red. The outward haemorrhage then ceased, and the cut vessels began to bleed into the tissues of the orbit, and did not cease until the orbital tissues and those of the lids were stretched until they were well nigh as firm under pressure as the enucleated eyeball; the haemorrhage spread further into the tissues of the cheek, some of the blood reaching almost to a level with the opening of the nostrils. Slight haemorrhage from the wound continued for two or three days. The absorption of the blood, however, was rapid, and except that there remained for some week more or less discoloration of the skin about the socket, there is nothing to be mentioned about the healing.

Examination of the eyeball. Vitreous perfectly fluid, thin, and of dirty, reddish brown color, and filled with what appeared to be disorganized blood. Microscopic examination showed it to consist of disorganized blood corpuscles, amorphous phosphates and immense cholesterine plates. The choroid showed marked evidences of degeneration, having a coarse, rough appearance. Between the choroid and the sclera were several small fresh haemorrhages, whose bright red blood contrasted strongly with the brownish-red without. The ciliary body, as well as the posterior capsule of the lens, were covered, about 1 mm. thick, with inflammatory products, giving the appearance almost of a vegetative process. This was not, however, firm, but easily broken down. The lens was cataractous, with a small, translucent, firm nucleus, and much cortical substance. The iris was not attached to anterior capsule of lens, as it had appeared to be.

The haemorrhages from the iris and those between the choroid and sclera point to an arterio-sclerosis of the whole intra-

ocular system of vessels as the cause of glaucomatous condition of the eye. If this be so, then an iridectomy done even during the first glaucomatous attack would have been useless, if not contra-indicated. The absence of pain upon pressure on the ciliary region is to be commented upon in view of the condition the ciliary body presented, and may have to be explained upon the supposition that repeated hæmorrhages in this region had destroyed the nervous supply in the ciliary body.

In the left eye I could discover no hæmorrhages; and except that the tension, before the removal of the right eye, was high and the anterior chamber somewhat too shallow, I could not make out that this eye was on the road the right had followed. The patient's vision was far from good, but much, if not all, of this could be attributed to the patient's age and hypermetropia. The tension of the left eye fell to normal after the removal of the right. The pupil was small and responded well to light.

SELECTIONS FROM AMERICAN MEDICAL JOURNALS.

IMPROVEMENT IN THE VISION OF MYOPIA BY TREATMENT WITHOUT GLASSES.

BY W. H. BATES, M.D.

CASE I.—Frank G., æt. 18, began treatment March 1, 1888. He had been using a solution of atropine, two grains to an ounce, in both eyes for a week. Pupils dilated *ad maximum*, throat dry, and cheeks flushed. The best vision obtained with both eyes without glasses was $\frac{1}{25}$ the normal. With — 4 D. S., vision $\frac{2}{5}$ the normal. Cloudy vitreous.

Treatment.—Iron, cod-liver oil, laxatives, counter-irritation over the spine, and the removal of hypertrophies in the nose.

March 30, 1888.—The vision of both eyes without glasses $\frac{1}{3}$ the normal.

CASE II.—Sam. J., æt. 18, began treatment March 5, 1888. Vision with both eyes $\frac{1}{25}$ the normal. With — 6 D. S., vision normal.

Treatment consisted of atropine in the eyes, iron internally, seton in temples, and nasal treatment.

March 24.—Vision had improved to almost normal without glasses $\frac{20}{xx}$ — .

CASE III.—Miss A., æt. 30, began treatment December 31, 1887. Vision with both eyes without glasses $\frac{1}{xx}$. With — 10 D. S., vision $\frac{2}{3}$ the normal.

Treatment which seemed to improve the vision was the removal of hypertrophies in the nose, tonics, and counter-irritation.

April 10.—Vision of both eyes $\frac{1}{2}$ the normal without glasses.

CASE IV.—Mr. M., æt. 20, began treatment July 2, 1888. Vision with both eyes $\frac{1}{25}$ the normal. Extensive choroidal changes, and floating bodies in the vitreous. Ordered atropine and iodide of potassium.

July 7.—Vision without glasses not improved. With — 11 D. S., vision $\frac{1}{2}$.

At different periods the nose was operated upon with only temporary improvement.

Three leeches, applied first to the left temple, and at a later date to the right temple, did not improve the vision.

August 4.—Vision the same as at the commencement of treatment. Atropine is still used.

The iodide of potassium was stopped and the vision improved. Various methods of counter-irritation over the epigastrum were employed with benefit.

January 2, 1889.—Vision without glasses $\frac{1}{3}$ the normal.

CASE V.—Hattie K., æt. 24, began treatment June 21, 1888. Vision with both eyes without glasses $\frac{1}{xx}$ the normal. With — 5 D.S., vision $\frac{3}{7}$ the normal.

Ordered atropine and iodide of potassium.

July 7.—Vision without glasses slightly improved.

Treatment of the naso-pharyngeal catarrh was now begun and continued.

August 25.—Vision of both eyes without glasses $\frac{1}{v}$ the normal.

CASE VI.—Louisa H., æt. 8, began treatment November 1, 1889. Vision without glasses $\frac{1}{xx}$ the normal. Ordered atropine and blue glasses, to stop her studies.

December 7.—With — 4.5 D.S. \bigcirc — 5.5 D.C., vision $\frac{2}{7}$ the normal.

January 17, 1890.—Pupils dilated *ad maximum* by the atropine. Vision of both eyes without glasses $\frac{2}{5}$ the normal.

CASE VII.—Nellie K., æt. 13, began treatment October 31, 1890. Vision of both eyes without glasses $\frac{1}{40}$ the normal. With — 10 D.S. \bigcirc — 5.5 D.C., vision $\frac{2}{7}$ the normal. Patient

was under atropine until November 16, 1890, when the vision was found to be unimproved with and without the above glasses. Atropine stopped.

Vision was improved by using a solution of bichloride of mercury as an eye wash.

Wearing a pressure bandage at night was beneficial for a time.

Treatment of the nose improved the vision.

A tenotomy of the tendon of the external rectus muscle of the left eye also improved the vision.

Eserine, by contracting the pupil, improved the vision early in the treatment, but made the vision worse when tried February 2, 1891, with the vision without glasses improved to $\frac{2}{5}$, the normal.

March 6.—Vision without glasses $\frac{2}{5}$ the normal.

Contracting the palpebral fissure (squinting) makes the vision worse.

CONCLUSIONS.

1. The vision in many cases of myopia can be improved very much by treatment without glasses, and frequently this improvement is so marked as to render glasses unnecessary.

2. An astigmatism of even 5 D. did not interfere with good results.

3. The greater the myopia and the older the patient, the longer is the time necessary to obtain the best results.

4. The use of glasses during the treatment must be prohibited.—*N. Y. Med. Jour.*

REVIEW.

OCULISTS' INDEX RERUM. Arranged and classified for the recording of ocular diseases, errors of refraction and surgical operations. By S. C. Ayres, M.D., Cincinnati. J. H. Chambers & Co., 914 Locust Street, St. Louis, Mo. Price \$3.00.

This extremely valuable addition to an oculist's record books, from the pen of our esteemed collaborator, Dr. S. C. Ayres, the forthcoming of which we announced in our March number, is now before us. Every oculist who keeps a careful record of his cases will at once see the great advantages which will accrue to him in his scientific work from this additional help to memory. We cannot, therefore, too highly recommend it to our confrères. The book is well gotten up in every respect, and does credit to the author and publishers.

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ORIGINAL ARTICLES.

THE VALUE OF WEAK CYLINDERS FOR THE
RELIEF OF EYE MUSCLE STRAIN.

BY JULIAN J. CHISOLM, M.D.,

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Chief in the Presbyterian Eye, Ear and Throat Charity Hos'ital of
Baltimore City.

Three years ago I read a paper before the ophthalmological section of the American Medical Association on the value of 0.25 D. cylinder in the correction of the lesser grades of astigmatism. My additional experience confirms the position which I then took.

The annoyance occasioned by eye strain demands recognition from complaining patients whose heads will ache when the eyes are much used. All astigmatic eyes do not suffer in like proportion. There are three factors at work that bring about annoyance. The first is the amount of eye work required by a badly shaped cornea; a second factor is the degree of fault; and a third is found in the nervous susceptibility of the patient.

As to the first condition, the amount of work required, the majority of astigmatic eyes only exhibit the trouble under forced application. Eyes which have done faithful and painless duty for many years are suddenly called upon for an unusual effort. They break down with pain, which then returns upon moderate use with a persistency that makes eye work unsatisfactory, and the individual miserable. The defect had always existed, and would not have been brought out had the additional labor not been undertaken. This is constantly illustrated in overworked advanced school children at examination periods. They complain of painful eyes and head from the too close application when their parents, who exhibit the same degree of irregular refraction, have never suffered. This complaint is especially made if the young patient is of the nervous type, is rapidly growing, and is more anxious to secure good school grades than to take open air exercise. Hence girls suffer more than boys.

Physicians are seldom consulted by healthy people who have no physical complaints; and likewise ophthalmic surgeons only see those whose eyes are not comfortable. Such eyes are not necessarily inflamed; nor is there always dull vision. Most frequently the eyes themselves look in every way well, but with the inability to use them with comfort. The majority of those who consult me for painful eyes and head see clearly, and so state promptly: "It is not that my eyes are not sharp seeing, for I can see any small object that any one else can see, but they are not comfortable under use and my head aches when I read." These two facts are daily noticed. So constantly are they complained of that rarely do I not find irregular refraction when these symptoms are present, headache being the chief. My experience enables me to formulate, at least for my own guidance, this axiom: *Headache under eye use with acute vision in by far the majority of cases means astigmatism, and usually of low degree.* If the irregularity of the cornea is not detected, it is because it has not been carefully sought for. It also means that the headache under eye use will not be relieved by any medication or course of treat-

ment until this irregularity of refraction is found and corrected.

Many specialists act upon the belief that $V=^{20}/_{xx}$ is incompatible with annoying irregular curvatures in the cornea, and that it is needless to seek for astigmatism in such eyes. In cases of eye pains with acute vision their attention is therefore diverted from the true cause of the eye trouble to the examination for irregular action in the socket eye muscles, of which there is endless variety both in eyes that give no trouble and eyes that are painful. I find $V=^{20}/_{xx}$ in one-third of my astigmatic cases; and this good vision among my most suffering patients. The most marked relief and the most brilliant results from the adjustment of cylinder glasses I obtained among this class. Many of them had been under treatment by specialists and were wearing + spherical lenses for near work but with no comfort. These cases are often mistaken for accommodative faults formerly known as muscular asthenopia, and for which 1 + D. was the best known remedy. In former years I prescribed such glasses fifty times where I now have occasion to prescribe them once.

I often wonder what has become of the hosts of hyperopic eyes that I formerly saw and treated with spherical convex lenses. That I see the same character of eyes now I am quite sure, but no longer from the same standpoint. A more careful examination proves these cases to have been mild grades of astigmatism, often myopic. The same class still come to me from other specialists who are holding the views that I formerly acted upon, before I found out my mistake.

Years back I became aware that the most annoying irregularities of the cornea are the slight deviations which are still compatible with sharp vision, $V=^{20}/_{xx}$ or $^{20}/_{xxx}$, seldom less than $^{20}/_{xL}$, and frequently the greater fault in one eye only. In my most ailing patients I so constantly find the lesser irregularities that I have been forced to the conclusion that in the high degrees of astigmatism the eye ceases to make the effort for acute vision, recognizing its inability, and hence the less muscular strain and consequently less headache. In the small irregularities of corneal curvature headache on eye use is the

most constant and conspicuous symptom. It is more common than eye ache although the two usually go together. When patients with refractive errors consult me complaining of defective sight and no pain in the head, as a rule astigmatism is either excessive or I find none of it. I accept as a most valuable aid in the search after astigmatism persistent headache on eye use. As I have previously said the reading of Jæger No. 1, with $V=20/xx$ by such patients to me no evidence that a painful degree of astigmatism does not exist. With this acute vision patients with over-strained eye muscles often cannot read with comfort ten minutes, day-light even annoys, and fixation for a short time, as looking into the face of a friend while conversing or into the plate while eating, excites nausea.

In the casual examination of these patients, some of them at first see no difference in the tinting of the lines on the clock dial chart. They will repeatedly say "I see no difference whatever in the color. To me they are all alike." This would look as if there was no astigmatism. After these repeated trials and assurances, most examiners would abandon the idea of irregular refraction. But I say to myself "here is a case of headache on eye use for near work. This patient feeling well can soon read himself into a headache. In my experience a low degree of astigmatism is by far the most painful source of this discomfort. I will continue my search until I feel assured that it does not exist." By perseverance in the examination of one eye at a time I will eventually get out of the patient that all the clock dial lines are not exactly of the same tint. Some will now have a slight grayish, bluish or brownish tint, which was not perceptible at the first scrutinizing of the card. Once they detect the difference they never afterward lose it. Some lines now are not as clean black as other lines, and a weak cylinder will clear all up better than the duplicate number of a weak spherical lens. Some patients will persist in the statement that there is a uniformity in color for all the lines until homatropia is used, when the slight difference which is the cause of all the eye trouble is discovered. The adjustment and wearing of proper cylinders, c.25 c. + or — will

promptly put an end to the eye and head discomforts which had been the torment of the patient for months or even years.

In my case book hundreds of such patients have been entered, persistent headache on eye use, the constant complaint, a low degree of astigmatism always found, a 0.25 D. cylinder prescribed with the result of treatment recorded at varying periods, days, weeks or months after the glasses had been given. "No headache since I have worn the glasses except on the occasion when I tried to read without them." By the wearing of these weak cylinders of 0.25 D. in a number of cases patients have suddenly jumped up from ten minutes' reading with pain to many hours' continuous reading without any head discomfort whatever.

I will give but one illustration from among this very numerous class of recorded cases because on account of her professional history it was of more than usual interest. The young lady was from New York City, *aet.* 16, and well developed. She had been under more or less constant treatment on account of eye discomforts for five years, and had been removed from school because she could not study without pain in the head. When the first consulted ophthalmic surgeon who had had her case under observation had exhausted all theories and treatment with no relief, and had finally found weak recti muscles for which he advised tenotomy, the father refused to have an operation performed. The young lady after an interval and still suffering was put under the care of a second specialist. Guided by the experience of the first as related by herself, he sought diligently to procure her relief. One by one all remedies were tried. Spherical lenses, practicing with prisms, internal medication, rest, but all with no benefit. When he had exhausted his resources he also suggested muscle cutting as the only untried remedy. He thought that relief would come surely through this surgical treatment. The father again declined to permit any operation. In the course of time this healthy looking girl, under blue glasses, was brought to my office for treatment. Her vision was $20/xx$ and for one or two minutes she could read No. 1 of Jæger. She was one of those

who insisted that the test lines were all of uniform color, but she suffered with more or less constant headache. Under homatropia horizontal lines seemed a little shady but not markedly so. Still she preferred a + 0.25 c. ax. 0° to a + 0.25 s. in brightening up the entire face of the card. When the effects of the mydriatic had passed off, although the lines had again resumed their uniform brightness she found relief in a — 0.25 c. ax. 90° rather than + 0.25 c. ax. 0°. She was ordered the weak concave cylinder for constant wear. Before two weeks had passed by she could read for hours, night or day, with no discomfort whatever. Her headache returned whenever, for experiment sake, she would put off her weak cylinder glasses, even for a short time. The relief from suffering was positive and permanent. I had a visit from the young lady one year after I had first seen and adjusted glasses for her. She still wore the weak cylinders and had had no trouble whatever. She had resumed her education, and as a diligent student was making up for lost time.

The necessity for recognizing the lesser degrees of astigmatism forces itself upon me daily. Long continued and persistent headache with eyes paining on use, uninfluenced by rest, medication, or hygienic influences, and relieved at once by a 0.25 D. c. ought to be proof enough of the necessity for discovering these low degrees of deviation from the true corneal curves. In many sensitive persons the verification of the diagnosis and the advantages of the treatment to the comfort of the individual are conspicuously shown when the cylinders are suddenly reversed. Pain and head discomfort seem immediately brought on by the malposition of the axis of the lens. Then the restful condition when the cylinder is placed at the proper angle in the trial frame.

This 0.25 c. not only makes good vision easy, but often will make faulty vision good. All eyes needing a 0.25 c. have not necessarily $20/_{xx}$ V. Some exhibit only V. $20/_{xl}$, and yet this weak cylinder will enable them to see clearly the 20 lines at 20 feet. This is curiously shown in eyes of the same individual which differ in visual acuteness; one eye may measure

$^{20}/_{30}$ and the other only $^{20}/_{40}$, and yet each is made $^{20}/_{xx}$ by the 0.25 cylinder. In another series of cases one eye will exhibit $^{20}/_{xx}$ with all lines sharp, the other $^{20}/_{xxx}$ with one series of lines more distinct. The 0.25 c. will bring the dull eye sharply up to the normal, and the same glass will brighten up the whole picture when placed before the eye which without homatropia indicated no astigmatism. Should the cylinders be reversed, however, in the good eye, irregularity in the blackness of the lines would at once show itself, in evidence that the small degree of fault was being concealed in the eye muscles. It would come out, in spite of muscular effort to the contrary, when the fault was doubled by the wrong position of the cylinder.

I daily see persons who, in giving their history, can fix the time from which their head and eye discomforts started. Up to a certain period they had used their eyes with comfort. Then came a sudden demand for closer application and with it the trouble commenced. As the astigmatism is usually a congenital fault it must always have existed, therefore, notwithstanding the astigmatism, the eyes had been comfortably used in moderation. We also often find that when some extra work had increased the eye strain and made the head ache, the rest given by the temporary wearing of a cylinder would in time enable the astigmatic eye to do without the spectacle provided no unusual eye effort be again made. With young ladies it is no uncommon occurrence to find cylinders discarded at the end of school life, at least by those with whom the demands of society allow no time for close eye work.

We consider the shape of the eyeball as much a feature to be inherited as the shape of the ear, nose, or mouth, with this important difference, that whether the nose is pointed or stumped we can smell with it equally well, but should any deviation occur from the typical shape of the eyeball interference with vision is the consequence. These deviations in the eye shape are the rule. A perfectly formed eye in these days is as much an exception to the typical shape as a beautiful face is to the average citizen. Hence it is that I find astigmatism extremely common. With those who must apply themselves

to close work, it is the common cause of head discomforts, which can only be relieved by rest, and this class can not afford it, or by the wearing of cylinders, which is now within the reach of everyone.

We often find a patient prompt in accepting or rejecting one of two cylinders that differ in strength a 0.25 D. There are some ophthalmic surgeons who will permit an eye to vary from a 0.5 to 0.7 and know that they are giving an immense degree of comfort to their patients by recognizing this difference. These very surgeons repudiate the ability of an eye to determine between a 0.5 and 0.25. The eye accepts the 0.25 c. but the ophthalmic surgeons have drawn the line of the 0.5 c., and avow they will never prescribe a glass that is weaker. The result is that some one else will have to do it. I find myself applied to by persons coming from other specialties with the 0.5 D. c. with head discomforts unrelieved, who secure freedom from headache and the ability to use their eyes with comfort when the cylinder has been reduced to 0.25. I so often find the use of a 0.25 D. c. making the difference to the wearer of from not being able to read a few minutes without headaches to reading for hours with no headache, that I expect to secure these good results in prescribing them.

Another very common experience with me is that persons who suffer with persistent headache and hardly remember the day that they have been free from it, secure relief from the day that the 0.25 D. c. was first put on.

In the last four years I have been using the 0.25 D. c. more and more frequently. To give some idea of the number of 0.25 D. c., which I prescribed I find that last year alone I gave them to over three hundred private patients and in hospital practice to fully as many more, so that in one year over six hundred pairs of 0.25 c. have been prescribed through myself alone. The uninitiated would say that in many of these cases the glasses must have amounted to nothing. That suggestion is promptly met by this counter-statement, all of these persons, mostly young students, book-keepers or sewing girls, suffered more or less severely with headache and eye pains on

eye use, and they had applied for spherical treatment with the hope of getting rid of their annoyances. As with them all close application was a necessity they all suffered from their daily work. In all of these a small degree of astigmatism was found, which a 0.25 D. c. completely corrected. The fault was most frequently in the horizontal meridian, next in frequency in the vertical, and least frequently in the oblique diameters of the cornea. As a rule the annoyances were greatest when the faulty corneal curvatures were obliquely placed. The 0.25 c. gave the relief sought in by far the majority of these cases. In many of these persons whose history could be traced perfect relief continued with the use of these weak cylinders.

I have formulated for myself in office work this order: When a young person with no eye congestion has $20/xx$ vision and reads readily No. 1 of the test type, complains of pain in eyes and head on use, so convinced am I that astigmatism is at the bottom of the trouble that I seek it at once in the very beginning of the eye examination. If it had not been found by others it is not because it did not exist, but because it had not been diligently sought. That a great many of these patients would exhibit heterophoria from the fixed standard of muscular strength, I am quite convinced. I find in by far the majority of cases with the correction of the astigmatism all evidence of muscle strain pass off, and in such patients the heterophoria does not call for recognition because it no longer annoys when the cylinders are worn.

The least degrees of astigmatism cause in the world the greatest amount of head and eye discomfort, and the 0.25 c. will correct this refractive error and relieve head and eye pains. I not only therefore say that the weak cylinder ought to be prescribed, but that the ophthalmic surgeon is remiss who does not seek, find and correct those small but annoying errors in corneal curvature.

SOLID MIXTURES OF HOMATROPINE AND COCAINE AS A SUBSTITUTE FOR ATROPINE AND DUBOISINE IN DETERMINING REFRACTIVE ERRORS.

BY CASEY A. WOOD, C.M., M.D.,

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With the discomforts and drawbacks attendant upon the use of atropine employed for the determination of refractive errors the profession is entirely familiar. The laity, too, are becoming more and more impatient of the ten days to two weeks partial blindness which often follows the instillation of atropine solutions when used for the purpose of prescribing glasses. Every oculist knows that many persons refuse to allow "drops" to be put into their eyes mainly on account of the enforced absence from work which their use commonly entails. As long as atropine is employed for the treatment of diseases that have already rendered the eyes unfit for work, no complaint is raised, but the employment of a drug that dilates the pupil, blurs the sight for distant vision and makes near work out of the question is extremely distasteful. More than that, there is a large percentage of the ametropic population urgently needing glasses who can not or will not spare the necessary time from business pursuits and an almost equal number who cannot be spared, however willing they may themselves be to go through a "course" of atropine. These individuals have to choose between submitting to an incomplete and perfunctory examination of the optician and jewelry-store order and allowing their refractive errors to go uncorrected.

I have devoted some months of the past year to experimenting with mixtures of homatropine (alkaloid, Merck) with cocaine (alkaloid, Merck) and I hope to be able to show, in confirmation of Lang and Berrett's statements that when used in a certain definite manner and dose and with proper excipients, this combination is a thoroughly reliable cycloplegic and quite as satisfactory as atropine for determining the refractive state of ametropic eyes. Furthermore, the employment of this mixture is not followed by the annoying symptoms incident to the employment of atropine, duboisine, or hyoscine. It accomplishes its purpose within an hour after being introduced into the conjunctival sac and the ciliary paralysis passes off, or may be made to pass off, within twelve or at most twenty-four hours.

Shortly after the discovery of homatropine by Ladenburg* of Kiel, some observers, Schell², Poutynski³ et al., experimented with it and as a result of these trials entertained the belief that it would be found to act generally as a substitute for atropine. We now know that this is only partially true, and that homatropine while it possesses properties of value to the oculist, acts in many respects quite differently from atropine. Poutynski, for instance, was wrong in thinking that since the mydriatic and cycloplegic action of homatropine is a transient one that its irritant effects upon the uveal tract are insignificant and that it can be used to advantage where stronger mydriatics, such as atropine, are contraindicated. Stewart** and Jackson⁴ have both drawn attention to the special irritant action exerted upon the deep structures of the eye by repeated applications of a watery solution of hydrobromate of homatropine and the former thinks this is one reason why ametropia cannot be properly estimated by its use. That the employment of homatropine hydrobromate, when used in aqueous solution, is unequal to the task of conquering the ciliary muscle has been abundantly proved by the observations and

*Berichte über die Deutsche Chem. Gesellschaft, Jan. 26, 1880.

**Phila. Medical News, March 3, 1886.

experiments of Dabney*, Holt⁵, Oliver⁶ and others, notwithstanding the experience of Risley⁷ (with Randall) and Jackson⁴. Lang and Barrett, in their classical essay, have also shown the insufficiency of the pure alkaloid even employed in the more effective castor oil menstruum. I have myself frequently had occasion to entertain the same doubts that Holt expresses in his paper as to the value of solutions in water of homatropine and its salt (however strong the solution and however frequent the instillations) for examining the usual run of cases requiring glasses. I have, for example, carefully followed Jackson's instructions, with a 2% aqueous solution of Merck's homatropine instilled every ten minutes for an hour, and at the end of that time have found patients still possessing some accommodative power. Watery solutions of this, as well as of most drugs, on the other hand, easily flow off through the canaliculi, and for all practical purposes are lost. This will account for the necessity, which Jackson insists upon, of frequent and continued instillations if one wishes to get satisfactory results from aqueous homatropine solutions.

More than one drop of fluid is not retained within the average sac-space. This one drop, in the case of the homatropine solution, acts as a stimulant to the lacrymal gland, and its secretion being added to the fluid already present, not only dilutes the latter, but also induces an overflow into the nose. From observations made upon patients during this investigation, I think I am within the truth in asserting that less than 10% of aqueous solutions of homatropine (or for that matter of most other drugs) is retained for any effective period within the conjunctival sac.

But there is another reason why in using homatropine there should be a *continuous* absorption of the drug. Its action upon the iris and ciliary muscle is cumulative up to a certain point and it is only by taking advantage of this cumulative property that we can hope to overcome the ciliary activity. In this important particular it differs from the fiercer action of

*Medical Record, Sept., 15, 1888.

duboisia and atropia, a single drop of a 2% solution of either alkaloid being sufficient to bring about a marked and lasting ciliary paresis. Tansley has sought to prevent these unpleasant effects and this waste of material by an ingenious little instrument, called a canaliculus compressor. I have no doubt it is an effective expedient, but think it would not be tolerated by many patients.

The effect of homatropine upon the accommodation is more lasting and more thorough when oleaginous menstrua and fatty excipients are employed for its application to the eye. This increased activity is, I feel convinced, entirely due to the fact that, as Green* asserts, the drug, when so exhibited, is retained within the conjunctival sac until absorption is complete. In Lang and Barrett's experiments it was found that from one drop of a 2% solution of the alkaloid in castor oil the fullest mydriatic and cyclopegic effects were obtained in about sixty minutes after its instillation. This thick, fatty menstruum does not pass off through the puncta, like water, but diffuses itself over the whole conjunctival and corneal surfaces until all the homatropine, with which it is charged, is absorbed. Moreover, since the pure alkaloid is less soluble in albumino-saline solutions—like the lacrymal fluid—than are its salts, the former is to be preferred, since the cyclopegic action is thus distributed over a longer period. All those who have used atropia with vaseline, lanoline, etc., will appreciate the difference in effect upon the ciliary body and nasopharynx between these mixtures and watery solutions of equal strength.

That cocaine and all its salts employed alone exert an evanescent influence upon the accommodation is well-known. As Nettleship^s has shown that (if applied persistently every few minutes for an hour) a very decided degree of cyclopegia is brought about, which begins to disappear in fifteen minutes after the last application, and the muscle regains full control in another three-quarters of an hour. In conjunction with homatropine, however, the paralyzing effects of each drug are decidedly increased. So far as I can learn, we are entirely in-

*Trans. Am. Oph. Socy., 1875, p. 355.

debted to the experiments of Lang and Barrett, just referred to, for a demonstration of this truth. These observers employed a 2% solution in castor oil of the alkaloids homatropine and cocaine, and the results obtained are from a single application of this mixture. The following extracts from their tables will serve to illustrate the contention:

AVERAGE ACTION OF HOMATROPINE AND HOMATROPINE
+ COCAINE.

											<i>Diminution of Range of Accommodation.</i>
											<i>Recession of Far Point.</i>
											<i>Recession of Near Point.</i>
											<i>Dilatation of Pupil.</i>
Time of Commencement,	-	-	-	Hom.	13.33	6.67	-	-	-	-	5.
Of Action, - - -	Hom.				10.	6.67	-	-	-	-	5.83
(In Minutes), - - -	and			Cocaine.							
Time of Maximum,	-	-	-	Hom.	60.	61.67	63.33	65.			
Action, - - -	Hom.				30.	61.67	77.	59.17			
(In Minutes), - - -	and			Cocaine.							
Time of Cessation,	-	-	-	Hom.	21.67	8.75	-	-	-	-	8.75
Action, - - -	Hom.				48	25.67	-	-	-	-	25.67
(In Hours), - - -	and			Cocaine.							

It will thus be seen that homatropine + cocaine dilates the pupil and paralyzes the accommodation more rapidly than homatropine alone, and that these results are more lasting and more decided than those following the employment of the latter.

It is a matter of speculation how cocaine increases, as it is now known to do, the cyclopegic and iridoplegic effects of all the other mydriatics. Jourevitsch and Maklakoff* both agree that cocaine favors the absorption of other drugs, the latter calling it the "multiplicator" of atropine and eserine.

Of course the greater effect of mixtures over members of a combination given singly is not a new observation in therapeutics. Witness, for example, the greater diuretic influence of the bromine and sodic salicylate compounds over the same amount of either of these agents given alone; or Brown-Séquard's** discovery that a given dose of the mixed bromides (KBr and NH₄Br) exert a greater sedative influence than the same quantity of either drug. My own notion is that cocaine renders the outer epithelial layer of the cornea (and conjunctiva) more pervious to the homatropine or the other drug. It certainly makes it more liable to abrasion, as every one knows, and if a thoroughly cocainized cornea be carefully examined with a Coddington lens, minute fissures will often be observed, running in all directions through the superficial epithelium. It is comprehensible that a similar effect is produced upon the conjunctival epithelium also, so that both miotics and mydriatics are quickly absorbed into the lymph spaces and capillaries and soon reach the interior of the eye.

Although I believe that the castor oil mixture of homatropine and cocaine, introduced by Lang and Barrett, is an efficient agent in determining refractive errors, there are, it seems to me, some objections to it. In the first place, an oily film forms upon the corneal surface which stands in the way of a distinct view of the fundus, and even interferes somewhat with vision. I think, also, that the same film makes it more difficult, than when the oily menstruum is not employed, to decide just when the shadow "turns" in the examination by retinoscopy. These effects are partially due to the difference in the refractive indices of the cornea and castor oil, and partly to

*Amer. Univ. Med. Sciences, vol. iv., 1889, p. 157

**The Physiological and Therapeutical Action of the Bromides. Clark & Amory, p. 105.

- the fact that the film is not always uniformly distributed over the corneal surface.

Thinking that the exhibition of solid homatropine and cocaine would best suit their peculiar cycloplegic action, I made a number of trials with these drugs, in the forms of discs, with various excipients. These, used alone and in combination, were chiefly boracic acid, dextrin, linseed jelly, gum acacia, marshmallow jelly, gum tragacanth and various kinds of gelatine. These experiments led me to select discs made from the latter as the best medium for exhibiting cocaine and homatropine, and I have had the most satisfactory results from them in single doses of gr. $\frac{1}{50}$ each. These discs or lamellæ were manufactured for me by Messrs. Wyeth & Bro., of Philadelphia, and in some respects are superior to the best French and English makes. They are absolutely non-irritant, and immediately become soft and pliable when placed upon the ocular conjunctiva. To this they readily attach themselves and remain *in situ* until they are entirely (and *slowly*) dissolved by the lachrymal secretion. The cost of these discs is also much less than homatropine solutions of the same strength (of which nine-tenths is probably wasted), used for determining refractive errors, because nearly all the drug is absorbed in a manner most likely to do effective work. In one disc there is exactly the same quantity of homatropine that is contained in one minim of a 3% solution, and I have calculated that in the lamellar form it is ten times more efficient than when dissolved in water.

The best results seem to follow the observance of these rules:

1. Having dampened a small camel-hair brush, touch it with a disc, previously placed on a piece of clean, dry paper, when the disc will readily stick to the brush. Telling the patient to look up, draw down the lower lid, and place the opposite surface of the lamilla against the closed scleral conjunctiva, toward the outer canthus. It at once adheres to the former, and the patient is now told to close the eye.

2. The patient must keep his eyes shut until the examina-

tion is made. This precaution is taken to lessen the danger of an abraded cornea, and to avoid the disagreeable and annoying dessication of the corneal epithelium, which sometimes follows the introduction of cocaine into the conjunctival sac. The moisture upon the lids prevents all this.

3. The examination must begin not earlier than sixty and not later than ninety minutes after the introduction of the discs, so as to take advantage of the period of maximum cycloplegia.

4. In persons under 25, or where there is reason to suspect accommodative spasm, I supplement the single disc by another, inserted fifteen or twenty minutes after the first.

5. I always warn the patient that there will be a little smarting after the introduction of each disc. This, due chiefly to the cocaine, passes off within a few minutes.

6. Following Lang and Barrett's experiments, I frequently introduce, after the examination has been completed, a Wyeth eserine disc (gr. $\frac{1}{1000}$), or a single drop of the castor oil solution ($\frac{1}{10}$ %) of eserine. In most cases this is sufficient to make it possible to do effective work within twelve hours, and in all instances within twenty-four hours. To avoid encroachment upon business time, I frequently use the lamellæ in the afternoon, and, by inserting a single eserine disc after the completion of the examination, the patient is enabled to resume near work the next morning. In cases where this is not possible, I direct him to return for a second application. The great advantage of this procedure over atropine, duboisine and hyoscine, in the case of business men and women, is apparent.

7. Both cocaine and homatropine are to some degree hydroscopic; discs prepared with these drugs should, therefore, always be kept in an air-tight receptacle.

I append short reports of a few cases, chosen from a large number, into whose eyes (after the refraction has been determined by means of discs containing gr. $\frac{1}{50}$ each of cocaine and homatropine, employed in the above mentioned manner), a 1% aqueous solution of atropine had been instilled three times daily for three days and longer. In some instances the

degree of myopia or hypermetropia developed by the atropine was a shade higher than from the use of the discs; sometimes it was slightly less. Occasionally, there was a slight variation in the axis of the cylinder accepted by the patient. On the whole, however, the differences were not greater than those which one would expect in observations made under similar conditions by different oculists. In a number of instances the position of the near point was noted by the Landolt optometer and convex glasses at the moment of greatest cycloplegia from the discs; it did not vary from that established later on by atropine. The refraction was measured by means of the Javal-Schiötz ophthalmometer and test lenses.

Case I. M. B., æt. 13. Occasional convergent squint for four or five years. Asthenopia after half an hour at school-work. R. E. V. with $+5 D =^{20} /_{LXX}$. L. E. with sph. $+5 D \cap cyl. +1 D$ ax. $90^{\circ} =^{20} /_{xx}$. Examined subsequently by Dr. Stevenson, under atropine, with same results.

Case II. C. F., æt. 18. Headaches and other asthenopic symptoms. R. E. with $+4.50 \cap cyl. +1$ ax. vert. $=^{20} /_{xx}$. L. E. with $4.50 D \cap cyl. +0.75$ ax. vert. $=^{20} /_{xx}$. Dr. S. reports same results from atropine R. E., but in L. E., $+4 D \cap +1 D$ ax. vert. $=^{20} /_{xx} +$.

Case III. A. F., æt. 16, seamstress. Supraorbital headache, etc. L. E., $+2.50 \cap cyl. +1 D$, ax. $90^{\circ} =^{20} /_{L}$. R. E., $+1.25 \cap cyl. +1.25$, ax. $90^{\circ} =^{20} /_{xx}$. Atropine 3 days. Dr. S. reports same result.

Case IV. Miss S., decidedly asthenopic symptoms after reading or other near work. Dr. S and I found the same refractive error in both eyes, I after the use of four lamellæ in 90 minutes, and he, subsequent to four days' institution of atropine: R. and L. sph. $+3.50 \cap cyl. +3.50$, ax. $85^{\circ} =^{20} /_{XL}$.

Case V. W. T., æt. 16. Has had a blepharo-conjunctivitis nearly whole life. Disc in each eye at 3 P.M.; another at 3:20. Examination at 4:15. R. E. with $-0.50 \cap cyl. -0.75$ ax. $130^{\circ} =^6 /_{VI} +$. L. E. with $-0.25 =^6 /_{VI} +$. No change after atropine.

Case VII. E. K., æt. 13. No ocular symptoms. After discs R. and L. E. with $+0.50 =^6 /_{VI} +$. Dr. Stevenson's report

after three days' atropine: "R. E. =²⁰/_{xvi} with +0.25. L. E. the same."

I have to thank Prof. Haines, of Rush Medical College, Dr. Stevenson, late House Surgeon of the Illinois Eye and Ear Infirmary, and Messrs. Wyeth & Bro., of Philadelphia, for their kind assistance during these investigations. In addition to those mentioned as foot notes, I am indebted for valuable information to the following instructive papers:

¹Lang and Barrett. The Action of Myotics and Mydriatics. *Oph. Hosp. Reports*, vol. xi, pp. 130 and 219.

²Schell. A New Mydriatic. *Phil. Med. Times*, October, 1880. pp. 7 and 47.

³Pautynski. Pilocarpin and Homatropin. *Klin. Monatsbl. f. Augenheilkunde*, 1880, s. 343.

⁴Jackson. Homatropin Hydrobromate. *Phil. Med. News*, 1886, p. 88.

⁵Holt. The Inefficiency of Hydrobromate of Homatropin in Controlling Accommodation. *Trans. Am. Oph. Society*, 1889.

⁶Oliver. The Comparative Action of Hydrobromate of Homatropine and of Sulphate of Atropia upon the Iris and Ciliary Muscle. *Am. Journal Med. Sciences*, July, 1881, p. 150.

⁷Risley and Randall. Value of Hydrobromate of Homatropin in Ophthalmic Practice. *Trans. Am. Oph. Society*, 1881, p. 22.

⁸Nettleship. On Cocaine in Ophthalmic Practice. *Trans. Oph. Society, United Kingdom*. Vol v., p. 226.

SELECTIONS FROM AMERICAN MEDICAL JOURNALS.

CONSANGUINITY IN DISEASE—WITH PARTICULAR REFERENCE TO OCULAR AFFECTIONS.

BY JAMES A. LYDSTON, M.D., PH. G., DENVER, COL.

Fellow of the Chicago Academy of Medicine; Late Assistant Surgeon Illinois Eye and Ear Infirmary.

The subject of consanguinity is one that to my mind has not received the profound consideration at the hands of the medical fraternity that one of such vital importance to present and future generations merits. It is true that many have given the matter some thought, but it has been a question of here to-day and away to-morrow, and either through neglect or fear of courting the criticism of a few in the medical world, it has been apparently consigned to the oblivion of the past; but with your kind permission I shall endeavor to resuscitate the dying subject by presenting for your consideration the topic of consanguineous marriages; and their bearing upon disease in a manner which an experience and careful observation of some years best enables me to do. It is not without full recognition of the fact that I trespass upon fields as yet unadorned by full verdure—in fact it is with this very object in view, having been rendered bold by the meagerness of our knowledge upon this all-important topic, that I invite attention to the following scientific facts, concluding with data which my own experience furnishes.

To begin with: What diseases are said to be directly or remotely dependent upon consanguineous marriages? To my

mind there are few diseases at present known to medicine that may be exempted from the category, but for convenience sake we will confine ourselves to a few of the following well-known factions, viz: Idiocy, epilepsy, insanity, hydrocephalus, albinism, and diseases of the eye—the last of which was the first to call my attention to the subject of my paper, and to stimulate me to a close scrutiny of the many cases falling under my care, and that of my brother physicians. Huth, who has written a most exhaustive treatise on the marriage of near kin, prefaces his statements by the remark that he has “divested himself of all prejudices in the consideration of the subject,” and takes the stand that disease is not found to any greater extent in the offspring of related couples than it is among those who are not so related, and one of the strongest arguments against the possibility of disease as a sequel in the event of such marriages, is the fact that in-and-in breeding among animals is practised to such a great extent without evil consequences, and in referring to this subject, says: “Although by in-and-in breeding man may be able to do a great deal in the way of alteration, he must still follow nature; he cannot go contrary to physiological laws. He can increase the qualities which he wishes to get only at the expense of qualities which he is content to go without, and can no more obtain an animal all fat than he can teach his breed to live without food.” Continuing, he says: “We must remember that ill-directed breeding is as bad when there are frequent crosses as when there are none; that it is the selection that is the great improver when properly directed, and that breeding in-and-in is only advantageous because it fixes the breed and obviates the necessity of crossing from an unimproved breed.” So that he tacitly admits that it is not a wise procedure, and we are aware that monstrosities are sufficiently frequent among the lower animals to excite suspicion as to the wisdom of the practice from a strictly biological standpoint.

Mr. Darwin says, touching on this point: “Nearly one-third of our race-horses have proved barren, or have slipped their foals”—a fact which he attributes to their high nurture or

close interbreeding. It is said that Nanthusius imported a gravid sow from England and bred closely in-an-in from the progeny for three generations, and with bad results; yet he esteemed one of the latest sows a good animal, and she bred well with a boar of different blood.

What are Mr. Darwin's conclusions in regard to this matter? He concludes that "on the whole in-and-in breeding does not affect, necessarily, the external form, while it does affect the general constitution, mental powers, and especially the reproductive powers, and states in his "Descent of Man," that "when the principles of breeding and of inheritance are better understood, we shall not hear ignorant members of our legislature rejecting with scorn a plan for ascertaining by an easy method whether or not consanguineous marriages are injurious to man."

It is true that this promiscuous intermarriage of near kin was followed to extremes by the Greeks, Egyptians, Assyrians and many of the barbarian tribes that figure so prominently in ancient history, and it is asserted with no marked evil results. But let us look at and study the table of the dynasty of the Ptolemies, and see what is portrayed thereby. No one will deny that the Egyptians decayed in wealth, intellect and power almost from the accession of the Ptolemies. Why? Certain authorities claim that their downfall was not due to their consanguineous marriages. To what, then, are we to ascribe their speedy annihilation? Are we to accept the bare assertion that it was not consequent upon the promiscuous marriages of near kin as an established and indisputable fact? It would appear not, but that we should, as scientists, probe the matter to its very core, amassing an overwhelming number of striking examples of the injurious effects of marriages among related couples, so that doubt may no longer exist in the mind of any thinking, reasoning human creature in regard to a subject of such vast importance to the future welfare of the human race. The "Arabian Knights" are teeming with instances of marriages between first cousins, and if we can believe any part of the same as suggested by observation, the disastrous

effects which followed such unions are enough in themselves to cause people of to-day to pause and consider ere they make the all-important step.

Indians never marry within their own family, but consider that marriage with strangers improves their offspring. Mantegazza says: "In the Argentine Republic consanguineous marriages are frequent with all their unhappy consequences!" Consanguineous marriages are more frequent among the Jews than among the Christians, and as a consequence we find insanity and idiocy to be more common among the Jews. Deaf-mutism is also more frequent among the Jews. We are aware that any disease such as syphilis, or other marked habits or other idiosyncrasies of parents, tending to weaken them are apt to cause an arrest of mental development in the offspring, and I argue that the mere fact of the marriage of near kin, their dispositions, hereditary tendencies and mental developments being necessarily closely allied, it is reasonable to infer that their children—if, indeed, they have any—will manifest defects in their mental organizations, physical contour and anatomical structures. The greatest difficulty with which we meet in these instances is to eliminate all other predisposing factors of disease, such as syphilis, alcoholism, etc., for we are certainly not at liberty to assume that consanguinity is the cause of the pathological manifestations except in those cases in which there is absolutely no other accountable reason to which the defect in question can be ascribed.

The question naturally arises: Are there any such instances? I hold that there are, having been convinced by numerous typical cases in my own practice in which I was able to gain a lucid history of the patient's parents, and without exception both the remote and intermediate history bore out the conclusion which I suspected before my inquiries were made, that the patient afforded a typical example of disease in the offspring of consanguineous parents. Dr. Bemiss, who has investigated the subject of idiocy in its relations to consanguinity, asserts that 15% of the idiots in our United States' Asylums are of consanguineous origin. Deaf-mutism is also shown to be consequent upon consanguinity.

In France MM. Boulin, Devay and Chipault have substantiated the theory by careful investigation. Wagner says in his general pathology in the chapter on inheritance: "Inasmuch as male and female fluids combine for the formation of the germ, the embryo may be constructed in its various parts after the fashion of one or the other parent; insomuch as it resembles the father it is less like the mother, and *vice versa*, so that by a preponderance of one side the influence of the other may be counteracted. * * * The mingling of stock is a means of preventing the degeneration of succeeding generations, while it is well known that the intermarriage of relatives tends to develop family traits and diseases to an extreme degree. It is especially known that in the case of cretinism and idiocy the marriage of related persons favors their appearance, while it is prevented by marriage among persons of different races and countries." The same, he says, "is true in a lesser degree of deaf-mutism, and other remarkable facts are the frequency of sterility in related couples, and the uncommon mortality of the children of such parents."

Dr. Morris, of New York, published the following table, which, as it illustrates in an admirable manner the influence of consanguinity in disease, I will introduce at this point:

Relationship	Families.	No. of Children.	Perfect Children.	Imperfect Children.	Per-cent.
Third cousins	13	71	42	29	40.8
Second cousins	120	626	360	266	42.5
First cousins	630	2,892	955	1,936	66.9
Cousins' offspring					
cousins	61	187	63	123	65.7
Uncle and aunt with niece and nephew	12	52	10	43	81.0
Double cousins	27	154	21	133	86.3
ncestuous	10	31	1	30	96.7

In conclusion, I will cite the following cases, occurring in my own practice, which present to my mind irrefutable proof of the pernicious effects of consanguinity in disease.

Case 1.—Three children in one family, parents first cousins, aged respectively, 3, 5 and 7 years. Ophthalmoscopic examination revealed in each case retinitis pigmentosa, the peripheral fields in each instance abolished, while central visual acuity was noticeably impaired in one case. Leber cites cases extending through six generations.

Case 2.—Case of microphthalmus right eye; parents second cousins.

Case 3.—Congenital aphakia, both lenses absent, child nine months; parents first cousins.

Case 4.—Typical albinism in two children of same family, with congenitally displaced lenses, tremulous irides, etc; parents first cousins.

Case 5.—Double aniridy in child, 3 years of age; parents first cousins.

Case 6.—Case of sclerectasia posterior, with subsequent choroidal changes, passing into a sclerotico—choroiditis posterior, child, æt. 7 years; parents first cousins.

Case 7.—Coloboma iridis: child, aged 4 years; parents second cousins.

The above cases have been selected for the reason that they seem to present typical illustration of the sequelæ in the event of such marriages, and while many more might be added, it is believed that they are all-sufficient.—*West. Med. Reporter.*

A QUARTER OF A CENTURY DEVOTED TO PERFECTING THE EXTRACTION OF CATARACT.

Clinical Lecture by PROF. L. DE WECKER, Paris, France.

Translated from *Le Progres Medical* by JOHN FORD BARBOUR, M.A., M.D.

GENTLEMEN.—I am happy to see among my auditors Professor Knapp, who, like myself, during the last twenty-five years has devoted special attention to patients affected with cataract, endeavoring to apply to their benefit the marvelous progress in ocular surgery. It is exactly twenty-five years since von Graefe published an account of his new operation of extraction, which still bears the name of von Graefe's operation, although it has undergone the most radical modifications. This operation made general the combination of iridectomy with extraction, and succeeded in bringing about an abandonment of simple extraction for a considerable period of time.

At present, in most statistical tables, procedures are designated as von Graefe's operation, which differ much more from the primitive method of the master than simple extraction differs from the operation of Daviel, whose name, however, is never mentioned. Modifications of the original operation of von Graefe were all the easier since his description of the procedure was somewhat inexact. Von Graefe accompanied this description with a diagram. He says: "The point A (the puncture) should be made in general at one-half a line from the corneal limit and two thirds of a line below the tangent to the summit of the cornea. With such a puncture and

a symmetrical counter-puncture at B, a wound is made, having a length of four and a half to four and three-fourth lines."

This buttonhole section, situated almost entirely in the opaque pericorneal tissue, underwent rapid modifications, affecting principally its peripheral situation as well as the breadth of the flap, which originally did not exceed a line and a half or two lines. Thus modified the operation of von Graefe became so general that the few adherents of simple extraction with large flap, such as Hasner, were considered behind the times by the new generation.

The first attempt to return to the old procedure was made by Liebreich in 1871, who abandoned iridectomy and made a section below through the entire cornea, which was revived seven years after by changing it to the horizontal diameter.

But Liebreich's section again encroached upon the non-transparent position of the cornea and presented all the inconveniences of very slightly elevated flaps, as Lebrun pointed out in 1872, requiring the wound to be half opened to admit of easy egress for the lens. To Lebrun should always be ascribed the merit of being the first to renounce the encroachment upon the sclerotic, which we consider a vice of operation.

Ten years after the appearance of von Graefe's operation, I entered the field in favor of a section borrowed from the old flap operations, numerous statistics of which I presented to the Congress at Heidelberg. Thus fifteen years ago, I attempted to unite the advantages of simple extraction, which exposes one to capsular retentions, to peripheral imprisonments of the iris and to migratory ophthalmia.

Was this a complete return to the teachings of Arlt, Sichel and Desmarres, who cut loose nearly one-half of the cornea, beginning one millimeter above the corneal diameter? No; for we consider such a flap too large, and that the operation may be improved by reducing its size and also by the employment of the fixation forceps and the retractor, two instruments which have had the most potent influence in furthering combined linear operations.

I showed, in presenting my operation to the Academy of

Sciences in 1875, that it is sufficient to detach one-third of the cornea instead of one-half (or nearly one-half), as was the usual custom before the introduction of linear extraction.

I did wrong to say *one-third of the cornea*, for in indicating one-third of the diameter as the breadth of my flap, that is to say, four millimeters (in a cornea twelve millimeters in diameter), this expression, *one-third of the cornea*, has given rise to confusion and a desire to modify the operation anew. The reduction of the section from the half to the third might appear too great, and in order to choose an intermediate figure between the half and the third, it has been proposed to take the *two-fifths*.

But there is evidently a misunderstanding here, and if I consider a flap having a breadth of *one-third of the diameter* of the cornea as one-third of the cornea, I by no means stated that a versed sine of four millimeters corresponds to an arc equivalent to *one-third of the circumference*, knowing well that in a circle it is the fourth, and not the third, of the diameter which represents the versed sine of an arc equal to one-third of the circumference. When I stated (*Traité Complet*, T. II, page 1013) that the detachment of the two-fifths of the cornea was an indefinite expression, I thought that it was proposed to measure the two-fifths upon the diameter of the cornea (which is far from easy to do in case of a straight line with a compass) and not upon the circumference, which is well nigh impracticable, as any one may convince himself by endeavoring to find upon the dial of the watch the arc corresponding to twenty-four minutes, that is, to two-fifths of the dial, without being guided by the figures. It may be responded to this that not only Critchett and Bowman, but I myself also, have chosen the *third of the circumference* for certain extractions and that this delimitation presents the same inconveniences, since guide points are as necessary in ocular as in general surgery.

But as concerns our English confrères, they make use of lancet-shaped knives, which guide them after penetration of the cornea, this measurement being facilitated by the employment of a lance adapted to the dimensions of the cornea, and

which, when it has penetrated to the bottom of the anterior chamber, allows of the construction of an equilateral triangle with its sides and the corneal section, thus indicating the division of the circumference of the cornea into three equal parts.

When; as is our custom, the straight knife is used, nothing is easier than to make a section of one-third of the circumference; it suffices for this to take the half of the upper vertical radius or one-fourth of the diameter. But where shall we find guide points for the two-fifths of the circumference? The two-fifths do not correspond to any exact fraction of the vertical diameter. It corresponds to a fraction which exceeds the third by a little more than a tenth of a millimeter (the third of the diameter being four millimeters, the versed sine of the two-fifths is 1.145 millimeters).

If the horizontal diameter is taken as a guide, one cannot any longer, as we do, make the incision exactly two millimeters above. It becomes necessary to measure off 1.855 millimeters above the horizontal diameter in order to get the two-fifths of the circumference. This, then, is entirely an approximation.

It is assuredly more practical to take as a measure a definite quantity represented by the third of the diameter, than "to oscillate, as Professor Panas proposes, between the third and the two-fifths of the circumference." For, as I have already shown elsewhere (Manual, p. 539), the difference between my flap and that of M. Panas' is entirely insignificant. The former comprises an arc of $141^{\circ} 3'$; the latter corresponds to an arc of 144° —the difference amounts to nothing.

The question of the precise size of the flap has its importance, for it is necessary in returning to the old flap neither to adopt excessive dimensions nor to loose the advantages gained since the linear extractions have been in vogue.

We ought to abandon neither the great security of the operation nor the great security of the patient. If it is desired to obtain coaptation, a more rapid cure with less prolapse of the iris, it is necessary to determine upon an exact delimitation of the dimensions of the flap, which I believe that

I have determined definitely by choosing the third of the diameter, that is, a maximum of four millimeters in breadth.

This figure should be maintained; one should neither go beyond it nor come under it. And as I believe that such a flap has no tendency either to prolapse spontaneously or to coapt less well than sections of less breadth, I have renounced completely, even for combined extractions, the flap three millimeters in breadth, that is, a section of a *third* of the circumference.

The objection which has been urged against my section that it is insufficient for certain very large cataracts (very dark or black cataracts) is, to a certain extent, justifiable, since I have endeavored to remedy this by changing the situation of my section in order to facilitate the egress of these large cataracts, or in order to prevent the breaking up of certain very hard cataracts, the border of which chips, unless they slip very easily through the section.

By taking for the base of my flap exactly the horizontal diameter of the cornea and by giving it a breadth of four millimeters, I get the easiest possible passage for the entire cataract, however large it may be. This flap, with a base of twelve millimeters, does not prolapse spontaneously nor slip from the action of the movements of the pupils, and gives, too, with a very large opening, an excellent coaptation of the wound.

After twenty-five years of investigations, during which we have performed thousands of extractions, we have now aimed at a result which does not seem to differ materially from that which our masters, Arlt, Sichel and Desmarres, taught us. However, we have demonstrated, and I trust in an irrefutable manner, that it is never proper to make a flap more or less than four millimeters in breadth, and that one should never leave the transparent tissue of the cornea in making a section. For, if we do not have to deplore the occurrence of suppuration in 10% of cases, as did our masters in spite of their wonderful abilities, these suppurations have been made to disappear almost entirely. This is not exclusively due to the rigor-

ous antisepsis, which we now observe. Before the employment of antiseptics, von Graefe had succeeded, with a wound which coapted much better than in the old sections, in reducing the cases of suppuration to 5%, and it is only the last 5% that antisepsis has eliminated.

It is then indispensable to conserve all the advantages of an exact coaptation, which is one of the chief results of von Graefe's labors.

The last five lusters have given us local anaesthesia by cocaine, which permits a facility of execution of which our predecessors never dreamed, and which enables us to attain to a truly ideal operation in favorable cases without the necessity of recurring to the perilous extraction of the lens with its capsule.

Thus it is possible at present to strip off the matrix of the lens, the anterior capsule, to expel by lavage, after the egress of the nucleus, all the cortical masses, to prevent prolapse of the iris or even its entire imprisonment in the cicatrix by a simple instillation or by the introduction of eserine into the anterior chamber along with the solution used for lavage.

If we take the statistics of our predecessors, out of one hundred patients, ten lost their eyes from suppuration, ten others from irido-choroiditis, haemorrhage, etc. At present, suppuration having become an insignificant factor, we still have ten other losses to cut down, which, even in the most favorable statistics, are reduced to 5 or 6%.

Apart from the great utility of antisepsis, the modifications of the operative technique, apparently so unimportant, have given the happiest results for the patients and the most satisfactory for the operator.

Here, then, patient and physician may felicitate themselves on having obtained the goal.—*Med. Progress.*

DOUBLE OPTIC NEURITIS OF MALARIAL ORIGIN¹.

BY FRANK W. RING, A.M., M.D., NEW YORK.

Member of the New York Academy of Medicine; Assistant Surgeon, Manhattan Eye and Ear Hospital, etc.

¹Read before the New York State Medical Society, February 3, 1891.

January 12, 1888. Mrs. F. K. W., æt. 55, consulted Dr. C. W. Packard, of New York, on account of failing vision. The patient was referred to me. She complained of a blur in the upper field. Upon examination I found moderate peripheric impairment of the field in the left eye. Right vision=²⁰ xv with+.75. Left vision, ²⁰ / _{xx} + with+1.0. Ophthalmoscopic examination negative.

January 13. The following morning the patient was led to my office by a daughter. R. V.=5 fingers; L. V.=perception of light. She had retired the preceding evening, seeing as well as when at my office in the morning, and awakened practically blind. Right field with candle, quick and good. Ophthalmoscope showed marked papillitis, œdema of the disc, evident infiltration in and near the optic nerve, veins slightly enlarged, no pulsation, arteries about normal, outline of disc somewhat obscure, slight tortuosity of veins, no retinal changes apparent. Approximate swelling of $3\frac{1}{2}$ dioptrics of nerve.

Thinking the case of unusual interest, I took the patient to Drs. Agnew and Webster. They corroborated my diagnosis and expressed surprise at the rapidity of loss of vision.

January 18. Perception of light in each eye. January 22. V.=nil.

January 30. Sixteen days from begining neuritis, complains of stiffness in knees. Has more or less difficulty in walking. When reclining, finds it impossible to turn over. The affection of the joints came on suddenly and in four days the patient could not rise from a chair without assistance. By being supported she could shuffle along the floor. On striking her quickly under the hip, the limb would fly up, and by this action she could ascend stairs. There was complete paraplegia, exaggerated reflex, ankle clonus. In fact, she lost all locomotive power of the lower extremities. The skin felt thick and numb. Bladder unaffected.

February 5. Patient for the first time in fourteen days has perception of light. Has enough control of her limbs to enable her to move about with the aid of a chair.

February 22. Vision improving. R. V=10 fingers. L. V.=5 fingers. Color perception lost as far as could be ascertained. Six days later can distinguish bright red. Field good, retinal vessels slightly diminished in size.

March 7, 1889, thirty-nine days from begining paraplegia, is able to walk. R. V.=²⁰/_{cc}; L. V.=⁴/_{cc}. Field good, color sense diminished. Nerves pale, otherwise the fundi are normal, with the exception of slight decrease in caliber of arteries.

April 7, 1889 R. V.=²⁰/_{XL}; L. V.=²⁰/_c. Color sense varies; calls red brown. Left nerve whiter than right.

April 17, 1886. Stiffness in knees entirely gone. Color perception impaired.

February 14, 1890, two years from initial papillitis, R. V= ²⁰/_{xv} with +.5; L. V.=²⁰/_{xx+} with +.5, which is a return to the original vision before the neuritis. Color sense decidedly impaired.

December 29, 1890, last examination and nearly three years from beginning neuritis, R. V.=²⁰/_{xv} with +.75. L. V.=²⁰/_{xx+} with +1.0. Ophthalmoscopical appearance: Right nerve bluish white, veins normal, arteries slightly diminished; no tortuosity; lamina cribrosa plainly visible. Left nerve bluish white, otherwise the fundus has a normal appearance. Color sense: pale yellow, green, or pink, looks drab; cannot distinguish

green from blue. Right eye—the field for yellow is much contracted. A little less for red, and less than normal for blue. Left eye—yellow visible in central vision only. Red, field tortuous in outline and very much diminished. Blue, contracted much less than in right, with a large scotoma in upper field. Field for white perfect in each.

The patient received a nutritious diet, iodide of potash, arsenic and strychnia.

During the entire illness, the patient was free from pain, slept well, appetite good, no nausea, no headache. The urine was examined several times, with negative results. No specific history. She has had eight children, all healthy, no miscarriages. Passed the climacteric at forty-two years. Mrs. W. has been a decidedly healthy woman, with one exception, and that exception is best expressed by the following extract from a letter written by Dr. Packard: "So far as I know, Mrs. W. has no specific taint. I have treated her during the past few years for several malarial attacks, accompanied with fever, characterized by periodicity, and that yielded to quinine. At such time she has suffered from gastralgia and enteralgia that I believed to have a malarial basis."

Resume.—An apparently healthy woman consults an oculist because of a slight blur in her vision. He finds both fundi normal, pupils slightly dilated and responsive to light. During the same night she becomes practically blind. The only apparent cause is a marked papillitis. This continues to be an idiopathic affection for sixteen days, then she has a paraplegia. The vision becomes totally lost. In fourteen days, upon a relaxation of the paraplegic symptoms, the sight gradually returns; and in two years is normal, with a decided defect in color vision.

Was the neuritis an idiopathic affection, or was it concomitant to the paraplegia, and what was the existing cause of both?

Optic neuritis is often accompanied with headache, nausea and vomiting; and it usually occurs from some intra-cranial disease, tumor or other adventitious product.

With tumor the progress is inclined to be slow and the prog-

nosis grave. To be brief, let us exclude tumor as a cause, also meningitis and sclerosis and Bright's disease for palpable reasons.

Retro-bulbar neuritis (von Græfe).—A condition in which we may have a sudden loss of vision. The pupil is usually widely dilated and not responsive to light. The disc becomes slightly elevated. Arteries small, veins tortuous.

"In retro-bulbar neuritis in the acute form, we have headache, orbital pain, increased by movement of the eye and pressure. Serous effusion of the optic disc and retina due to compression of retinal vessels." (Knapp.)

In Noyes' admirable treatise on the eye (1890) he describes a toxic retro-bulbar neuritis, where the atrophy succeeding the inflammation is due to a lesion of the axial fibers of the nerve, and cites a case of Uhthoff's, where he localizes the character of the lesion in color scotoma. If there is a retro-bulbar neuritis due to tobacco and alcohol poisoning, why may there not be a similar affection due to malarial poisoning?

There are certain affections due to the action of malarial poison upon the system. There is a *bacillus malariae* particularly affecting the spleen. This bacillus has been found in the blood during the fever, causing marked changes in it.

Let us turn our attention to another cause of papillitis, denied by some, *i. e.*, distention of the sheath, or hydropsia of the optic nerve, which is a serous effusion into the optic sheath coming from the cerebral arachnoid space.

"A fluid effusion into the arachnoid space and increased intra-cranial pressure are always associated with an accumulation of fluid in the intra-vaginal sheath, which œdema will cause a swelling of the optic nerve." (Schwalbe.)

"The intra-cranial pressure must force the fluid from the arachnoid space along the sheath of the optic nerve into the canal-like system present in the lamina cribrosa, causing swelling and congestion of the disc." (Pagenstecher.)

Bull says, loss of vision from isolated papillitis alone is never sudden, and that distention of the sheath alone is not sufficient to produce papillitis, but may intensify it. Hughlings Jackson

is of the same opinion, and the latter also says there is nearly always a visible stage of neuritis before sight fails.

Macnamara, in his text-book of disease of the eye, cites a case precisely similar in many respects to the one in question. A girl, *æt.* 13, was attacked with intermittent fever, after which she had paralysis of the lower extremities, and a partial inability to move the right arm. Pupils dilated and insensible to light. Optic papillæ swollen and hazy, with serous effusion into the nerve and surrounding tissue. She became quite blind. Her recovery was gradual and perfect, both as to the paraplegia and vision. He remarks that this is an example of a class of cases not very uncommon in India, and depends upon malarial poison affecting alterations in the blood. He gave, as a direct cause, a serous effusion into the optic thalami and corpora striata. The pressure thus exerted on these nerve centres, interfering with the volition of the patient over the affected limbs, and the serous effusion or exudation into the papilla and pressure upon the optic nerve fibers, causing the loss of vision.

I offer this paper as a contribution to the literature on optic neuritis. I am aware there may be double optic neuritis, with and without loss of vision; also with gradual or sudden loss of vision. But, as a rule, there is a stage of neuritis visible before the blindness. Here the fundi were known to be normal a few hours before an almost total loss of sight.

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ORIGINAL ARTICLES.

HOMATROPIA IN REFRACTIVE CASES.

BY JULIAN J. CHISOLM, M.D., BALTIMORE, MD.

I have been so often asked by letter what mydriatic I use in refraction work that I am induced to send you a few lines indicating my daily practice. Since 1883 I have been using homatropia with such steadily increasing confidence that now I rarely use any thing else; use it in aqueous solutions, grs. vi, to $\frac{5}{2}$ j. I instill a few drops into the conjunctival sac, the lids being held apart for a minute so that the drops can not be expelled. This stretching of the lids apart removes the puncta from the eye-ball, and prevents the medicated liquid from escaping into the lachrymal sac. In from thirty to sixty minutes the eyes are ready for testing with pupils well expanded and accommodation for all practical purposes suspended. The aqueous solution is absolutely painless and in this regard has a very decided advantage over the oleates, which may be more economical in use, but cause pain in their application. I find no refractory cases to the influence of homatropia and consequently I have no occasion to use atropia, hyoscamia or duboisia. I used all of these salts

formerly for correcting errors of refraction, but now restrict them to iritic troubles. I am quite sure that I do not use atropia once to the hundred applications of homatropia.

The marked advantages of homatropia over all other mydriatics is the evanescent nature of the phenomena induced. As a rule, with very few exceptions, the effects are pretty well off by bed time from morning instillation, and before twenty-four hours have expired full eye work can be resumed, so that by taking advantage of Sunday, business men need not lose one hour from their daily work. So very valuable is this single quality of transient physiological action that it alone should drive atropia from daily use in the adjustment of lenses. Judging from the entire satisfaction which homatropia gives me in refractive work, I consider a physician culpable who robs a working man or a sewing woman of a week's daily bread through his preference for the more persistent atropia. Perhaps he does not know, and I am afraid sometimes does not value, how much misery he entails in carrying out his pet projects with atropia, duboisia or hyosciamia. I am very glad to say that in homatropia I have found a much better remedy than atropia. It always serves me faithfully and does not annoy my patients. I find it strong enough in simple aqueous solutions unaided by cocaine. Years ago I tried castor oil as the menstruum, but after a few months gave it up for the aqueous solution which I daily use. When I read of the obstinacy attending the relaxation of the accommodative muscles in the experience of some specialists, and how homatropia is never strong enough to meet their requirements, I am only glad to say that I do not come across such cases every day or even once a month. I take great comfort to myself that I have not annoyed the 99 cases in seeking the one refractory case, that rebelled against the persuasive influence of the milder mydriatic.

A SIMPLE SKIASCOPE.

BY H. V. WÜRDEMANN, M.D., OF MILWAUKEE, WISCONSIN.

The findings of the "shadow test" are accurate to .25 D., so I have learned to place such reliance upon the method that were I suddenly deprived of it, I would be at loss to do my refractive work properly, especially in low grades of astigmatism. The use of the Skiascope, instead of being merely an additional test, facilitates the examination greatly, and the results obtained by this method of ocular examination may be relied upon more than any other. I would have no hesitation in fitting glasses by Skiascopy alone but of course use it in conjunction with other methods.

The instrument figured has given such satisfaction that I take pleasure in bringing it to the notice of the profession. It consists of an oblong blade of hard rubber in which are inserted twelve plus and twelve minus lenses. The method of using this instrument is similar to that of my disk skiascope (see JOURNAL, May, 1890,¹) with the exception that instead of rotating, the patient raises or lowers the contrivance by the handle at the word of the examiner. At first the subject brings the plus .75 lens before his eye which completely neutralizes the movement of the lighted retinal area if he be emmetropic. If he is known to be myopic or hyperopic from a



HAND SKIASCOPE.

previous test, the skiascopic examination may be begun with the calculated lens. The shadow test will then be both a corroborative and a finer test of the refraction. If the neutralizing lens be convex the refraction of the eye in that meridian is .75 D. weaker, and if concave the same amount stronger. Thus we add .75 D. in myopia and subtract it in hyperopia. (see article by author.¹)

If stronger glasses be needed a pair of lenses from the trial case may be worn by the patient in a trial frame behind the instrument and their strength added to those in the skiascope. Thus any combination may be secured. Both the disk skiascope and the hand instrument are made by the firm of Geo. Tiemann & Co., New York, with the excellence that characterizes all their productions.²

¹"The Use of Skiascopy," AMERICAN JOURNAL OF OPHTHALMOLOGY, May, 1890.

²I understand that Landolt uses a hand "retinoscope" in his Paris clinic, but I have not seen this instrument.

AN ACUTE GLAUCOMATOUS ATTACK IN THE
RIGHT EYE OF A COLORED MAN, AET. 24—
LEFT EYE WAS DESTROYED SIX YEARS
PREVIOUS BY A PISTOL BALL. RE-
MOVAL OF LEFT EYE.

BY GEO. S. LLOYD, M.D., TARBORO, N. C.

In the AMERICAN JOURNAL OF OPHTHALMOLOGY of December, 1889, Dr. B. E. Fryer, of Kansas City, Mo., reports a case of "Acute glaucoma in the right eye of a patient, aet. 28, the left eye being destroyed by traumatism," and in conclusion writes:

"The general belief is that glaucoma is not produced sympathetically; but is sympathy never a factor?"

In response to the above question, I wish to report the following case, referred to me by Dr. Zeno H. Brown, of Greenville, N. C. The patient, on awakening one morning, two weeks prior to the visit to me, was greatly alarmed on account of his vision being much decreased in the right eye from what it was on retiring. He discovered that objects looked very dim and misty; that there appeared a fog which, at times, lasted from a few minutes to several hours. Several days elapsed before the eye began to pain him. The pain was very severe and he required opiates to obtain relief. On the fourth day he noticed a red and blue *halo* around a lamp (this symptom being most observed by the patient), and complained of fulness of the eye.

Examination.—Vision right eye, $20/200$. Left eye nil.

Upon examination I found the pupil of the right eye partially dilated, responding slowly to light. The field of vision was slightly contracted on the nasal side; very little change

in the depth of the anterior chamber. Tension +2. With the ophthalmoscope the cornea appeared slightly "steamy." Aqueous, lens, and vitreous normal. The optic papilla was slightly cupped.

Six years before the left eye had been injured by a pistol ball. This injury resulted in complete destruction of the eyeball. I prescribed eserine dropped into the right eye several times a day, and advised the immediate removal of left eye, to which he did not assent. The patient returned home the same day with instructions that if the right eye did not improve within five days he should return prepared to remain in Tarboro several days, as I would perform an iridectomy on the right eye and also enucleate the left one. I, anyhow, advised his return, should his right eye, even, improve, for the removal of the left eye, as, in my opinion, the left eye was the immediate cause of the disease in the right eye. In a week I received a letter from him, saying that all of the above symptoms had entirely disappeared, under the treatment.

I saw him again on May 7, when on a professional trip to Greenville. I then found vision, right eye, $20'/LXX$, and the entire cessation of all the symptoms. The nerve was now normal in appearance. Tension normal.

Dr. H. O. Hyatt, of Kingston, N. C., saw him with me and confirmed my opinion. Having again warned him of the danger due to the presence of the shrunken eye, he consented to its removal; so, on the following day, assisted by Drs. Hyatt and Zeno Brown, I performed this operation.

Since the operation, I have been apprised, there has been no return of the symptoms above recited.

CASE OF CHANCRE OF THE RIGHT UPPER LID.

FROM DR. A. ALT'S CLINIC,

Reported by Dr. W. L. Blickhahn, St. Louis.

P. Mc., male, æt. 40, presented himself at Dr. Alt's clinic at the Beaumont Hospital Medical College, on April 15, 1891, with a swelling on the right upper lid, chiefly its temporal half, and the lid margin. There was a reddish appearance of the conjunctiva corresponding to it, but no ulceration, and apparently no denudation of the epithelial surface.

He gave the following history: He had had a sore on his penis twelve years ago, which healed promptly on using local and constitutional (?) treatment. No sequelæ appeared. On February 5, 1891, he again discovered a sore on his penis. He called on a physician who treated him. Some time after he noticed that his right eye was red, and that a lump had formed in the right upper lid. The eye was treated by means of an "eye water" and "salve." As it did not improve, he was sent to an ophthalmological clinic, and there it was decided that he must have inoculated his eyelid with matter from his penis. He was given "a wash" and an ointment, and some days later presented himself at Dr. Alt's clinic at the Beaumont Hospital Medical College.

In spite of this history the diagnosis of hordeloum was made. The patient was treated in the hospital department on account of the sore on the penis. What was considered to be a "phagedenic chancroid" had nearly destroyed the glans. As

the surgical treatment was very painful, and his eye did not bother him, only that he feared it might do as his penis did, he begged to have the slitting of the "stye" put off.

Looking on it as a simple affair (it was to all intents and purposes an ordinary stye, in the depth of which pus was suspected to be lurking), the patient was given an antiseptic lotion and kept under observation. One week from the first inspection the swelling had increased somewhat, though the inflammation was not very active; there was no general œdema of the lid, nor was there much pain, and Dr. Alt suggested incision as a means of diagnosis, he being skeptical as to the specificity of the tumor, and he made two parallel incisions through the swelling. No pus, but some serous fluid and blood came from the wound. Bichloride solution and cold water were now ordered. In spite of this treatment the lid swelling increased more and more, and a slight general œdema came on. This increased slowly from day to day; the lymphatic glands in front of the ear and at the angle of the jaw became enlarged, the incised portion and the neighboring tissue took on a grayish color, and soon broke down. Pyoktanin had no influence on the destructive process, which increased rapidly.

On May 6, therefore, the ulcer was thoroughly cauterized by Dr. Alt, by means of the galvano-cautery, and from that time on it healed gradually.

The patient was seen daily. After the cicatrix had formed, the lid remained swollen, of a peculiar copper color, and with the advent of folds in the skin of the lid a furfuraceous desquamation took place; this continued for a couple of weeks; likewise a blepharitis was developed, continuing for about ten days. Pyoktanin was again used after the cautery for a day or two. Since it did no good, in fact, appeared to irritate (1-1000), its use was suspended and bismuth subnitrate and iodoform were used alternately. The blepharitis was treated by means of an ointment of aristol (20 gr.-5ij), and yielded, although not rapidly so.

After the incision had been made it was clear that this was

no ordinary hordeolum, though before that it certainly looked as much like an hordeolum as could well be.

After the sloughing set in and played such havoc with the lid, it was concluded that here was phagedenic *chancroid* of the upper lid, as the diagnosis of chancroid of the penis could hardly have been disputed.

The absence of suppurating glands in the groin was noticeable and remarkable, though it was feared that the buboes on the side of the face, the result of the ulcerating sore on the lid, would suppurate. This did not, however, occur.

In the latter part of June a cutaneous efflorescence made its appearance on the chin. Later on, the side of the nose, then the whole face, and lastly the trunk and extremities were involved. When first seen, it looked like an ordinary acne papule; later on, the base became broader, the elevation less marked and central desquamation was observed. The papules were tender on pressure. Dr. J. B. Keber, Professor of Dermatology at the Beaumont Hospital Medical College, was now consulted, and his opinion was that it was a syphilide, and he pronounced it a maculo-papular syphilide.

The history of a sore on the penis, followed by a sore on the lid which, until aggravated, behaved like any chronic granuloma, and the subsequent appearance of the cutaneous manifestation scarcely leave room for doubt as to the diagnosis of syphilis, and that the growth in the right upper lid was a chancre; whether inoculated thereon from the penis or not, may be doubted.

Had the eruption not appeared, this case would, undoubtedly, have been reported as something extremely unique and rare in ophthalmological experience, a chancroid of the lid. Had successful early specific treatment been instituted, an error would most likely have been made. At one time in the course of treatment and observation, the thought was advanced that the chancroidal inflammations were progressing on syphilitic soil, and the surgeon in charge of the patient was asked to give him specific treatment. He prescribed pills of the proto-iodide of hydrargyrum, with the result, in twenty-four hours,

of seeing much that he had gained, lost, the sore having begun to ulcerate again, and very viciously. The administration of the mercurial was suspended, nitric acid applied again, and another start made toward recovery. There was nothing observable about the lid at the time, because it was gradually getting worse and worse, as it was, and the attempt at treatment (constitutional) was made before the cautery was used.

The patient is now getting well under antisyphilitic treatment.

CORRESPONDENCE.

CHICAGO, June 29, 1891.

Adolf Alt, M.D., St. Louis, Mo.,

MY DEAR DOCTOR.—Your article will appear in the next number of the *North American Practitioner* in full. I regret very much that you should have taken so much notice of a little editorial which was taken from the press more as entertaining reading matter than serious communication. Your position in medicine is too well known for any one to take the matter seriously.

Regretting very much that this should have happened and trusting it may teach the editors wisdom, I am,

Very respectfully yours, BAYARD HOLMES,
Editor *North American Practitioner.*

SOCIETY PROCEEDINGS.

AMERICAN OPHTHALMOLOGICAL SOCIETY.

43 PRATT STREES,
HARTFORD, July 20, 1891. }

The Twenty-seventh Annual Meeting of the American Ophthalmological Society will be held this year, beginning on Wednesday, September 23, at the Arlington House, Washington, D. C. The rates for members and their families are \$4.00 per day, at the Arlington House. Special rates will probably be made by the different railroads, and announced in connection with the forthcoming programme of the Second Congress of American Physicians and Surgeons, in connection with which this Annual Meeting is to be held.

This Annual Meeting is in connection with the Second Congress of American Physicians and Surgeons, and takes the place of the usual July meeting.

Invitations to attend the Congress have been extended to a number of the most noted ophthalmologists abroad.

Titles of the following papers to be read at the Meeting have been received, and will take precedence on the bulletin:

Dr. C. S. Bull.—1. Gouty Retinitis—Neuro-Retinitis and Chorio-Retinitis.

2. History of case of brain tumor with autopsy.

3. The operative treatment of Detachment of the Retina by Schöler's method with report of five cases.

Dr. F. M. Wilson.—The use of Vaseline in gonorrhœal conjunctivitis.

Dr. P. A. Gallan.—Case of orbital traumatism followed by

immediate monocular blindness due to fracture of the foramen opticum.

Dr. H. Derby.—The significance of macular changes in advancing myopia.

Dr. F. Buller.—Glaucoma after extraction of cataract.

Dr. H. S. Oppenheimer.—The Blind of New York City.

Dr. G. E. De Schweinitz.—1. Additional experiments to determine the lesion in quinine blindness.

2. A case of Elephantiasis of the eyelid.

3. A case of Acute Glaucoma occurring in an eye with Coloboma of the iris and supernumerary pupils. (The first two papers illustrated by photo-micrographs and microscopic slides.)

Dr. C. A. Oliver.—A clinical study of the ocular symptoms found in the so-called Mongolian type of Idiocy.

Dr. E. E. Holt.—Extraction of foreign bodies from the Vitreous.

Dr. Swan M. Burnett.—Contributions to the study of heterophoria.

Dr. D. Webster.—Report of cases of cataract extraction.

Dr. S. B. St. John.—Extraction of foreign bodies from the interior of the eyeball.

Dr. B. L. Millikin.—A partially bony growth of orbit—removal—recovery.

Dr. D. De Beck.—Clinical studies in scotoma scintillans.

Dr. A. G. Heyl.—Retinal vessel observations in contusion of the brain.

Dr. J. A. Andrews.—1. Ulcerative keratitis in the Negro.

2. Eye complications in La Grippe.

Dr. S. Theobald.—1. Subnormal accommodative power in young persons a not infrequent cause of asthenopia.

2. A case of successful skin grafting upon the eyelid by Thiersch's method.

3. Supplementary note to the case of useful vision maintained by the aid of a totally dislocated lens, heretofore reported to the Society.

D. H. Knapp.—1. The occurrence, prevention, and management of prolapse of the iris in extraction of cataract.

2. Demonstration of a roller forceps for pressing out trachomatous granulations according to the mangle principle.

Dr. J. C. Kipp.—1. Recurrent inflammation of Tenon's capsule of both eyes in connection with mercurial poisoning.

2. Phlegmon of the orbit in the new-born.

3. Gangrene of the skin of both lids in both eyes.

Dr. L. Howe.—On the measurement of simple and compound lenses.

Dr. J. A. Lippincott.—Routine syringing-out of cortical matter in cataract extraction as illustrated by 100 cases.

Dr. Geo. Strawbridge.—Two cases of intense vertigo, produced by an attempted correction of astigmatic refraction.

S. B. ST. JOHN, Secretary.

SELECTIONS.

HOW TO USE MYDRIATICS.

At a meeting of the Philadelphia County Medical Society, on June 24, Dr. Edward Jackson read the following paper:

The present purpose is to discuss methods, not indications, for using these drugs; but, in passing, it is worth repeating, since it is so often forgotten, that remedies of this sort are too powerful to be used indiscriminately. If one has not been able to make a positive diagnosis in a case of ocular inflammation, to clearly recognize the indications, and to definitely exclude the contra-indications for one of these drugs, he should let them alone, and confine his hit or-miss prescribing to such drugs as boric acid or weak solutions of common salt, whose power for harm is really very slight.

These drugs are applied to the eye for their direct influence on the cornea, iris or ciliary body. In either case they must be absorbed through the cornea, the lymph streams of which are in close relation with those of the anterior chamber. Any portion of the drug that may be absorbed from other parts of the conjunctival sac is carried into the general circulation without coming in contact with the structures it is intended to influence. Any solution placed in the conjunctival sac is almost immediately diluted by the lachrymal secretion present; only the part with which it first comes in contact receives it of full strength. Now, if the amount of fluid instilled is very large as compared with the amount of tears diluting it, the dilution is of very little importance. But instillations of large amounts of mydriatic solutions are not advisable, because they give the maximum of absorption into the general circulation with the

minimum of effect on the eye. And one thing to be constantly guarded against in the use of mydriatics is the excess of constitutional action. Therefore, a mydriatic solution used in the eye should be instilled so as to come immediately in contact with the cornea while of full strength—that is, it should be placed at the upper margin of the cornea, allowed to flow over the surface of that membrane, and the closure of the lids prevented as long as possible, to allow absorption to occur before the fluid is swept away by the movements of the lids and diluted with the tears.

Instilled in this way, the concentration of the solution when it comes in contact with the corneal tissue, and consequently the amount absorbed, may be ten times as great as if the single drop of the same solution had been placed in some other part of the conjunctival sac. Thus applied, a very small drop of solution suffices to bathe the whole cornea. A dropper giving a small drop is therefore to be chosen. One is readily obtained with a small point that will drop half minims, or even less. The use of such a dropper allows the employment of stronger solutions than it would otherwise be safe to employ, or a larger number of instillations may be made in the same space of time without producing symptoms of mydriatic poisoning.

It is by attention to such a minute point of technique that one surgeon will at once secure the dilatation of an inflamed iris, or the complete relaxation of the accommodation under homatropine, where another less careful will fail to attain the end sought, or to give relief to his patient. And even where the utmost power of the mydriatic does not need to be exerted, to obtain the effect that is required with the least danger of constitutional symptoms, or with the minimum of constitutional disturbance, is a very important point; for these symptoms, though really not indicating any danger to life, are extremely annoying and alarming to the patient. They occur quite frequently after the use of mydriatic solutions, and such occurrence has much to do with the objection of patients to the use of mydriatics in the diagnosis of ametropia.

The strength of the solution of one of these drugs to be used in the eye varies with the purpose for which it is used. To break up the adhesions in a case of iritis, the stronger mydriatics are to be employed and in strong solution—as atropine sulphate 1 to water 50, or about 10 grains to the fluidounce; daturine sulphate 1 to water 100, or about 5 grains to the fluidounce; duboisine sulphate 1 to water 100, or about 5 grains to the fluidounce; hyoscyamine sulphate or hydrobromide 1 to water 100, or about 5 grains to the fluidounce. The effect of either of these solutions may be somewhat increased by using cocaine with it. But the patient should not be intrusted with the cocaine solution for home use, because the temporary comfort it gives in many cases leads sometimes to dangerous excess. Either of the above solutions is to be used one small drop in the eye at a time at intervals of ten minutes until the dilatation of the pupil is secured, and then at such intervals as may be necessary to maintain such dilatation, and continued three times daily until it can be replaced by a weaker solution.

In making the mydriatic attack on a case of plastic iritis, it is, to a certain extent, simply a question of whether we can get enough of the mydriatic into the eye without getting too much into the general circulation; and to accomplish this we must prevent the solution from making its way into the tear passages, and so being absorbed from the respiratory and digestive tracts, as well as from the conjunctiva. For this purpose it is often recommended to make pressure on the inner canthus. But such pressure is quite ineffective. Even the placing of a little clamp on each canaliculus, as proposed by Dr. Tansley (*Transactions of the American Ophthalmological Society*, 1888), does good mainly by the displacement of the puncta that it causes. The most effective means is to so draw on the skin of the lids as to evert the puncta, and hold in contact with them a small pledget of dry absorbent cotton. This will prevent the passage of any fluid from the eye into the lacrymal sac, and permit us to apply the mydriatic vigorously to the cornea.

For paralyzing the accommodation of the eye, solutions of

the same drugs of about half the above-mentioned strengths may be instilled three or four times daily.

Probably a single efficient instillation of this kind, or at most two or three, would be sufficient to produce complete paralysis of the accommodation in almost every case, with the eye in anything like normal condition. . But frequently the instillation must be intrusted to unskilled hands, and so may produce but a small fraction of its full effect, and in a few cases the active hyperæmia, caused by the mydriatic, and involving the anterior segment of the globe, may increase the difficulty of attaining complete ciliary paralysis; so that it may be necessary to continue such applications for some days.

For simply paralyzing the accommodation, however, our most valuable agent is homatropine, commonly used in the form of the hydrobromide. Of this two or three per cent solution, 10 or 15 grains to the fluidounce, should be instilled every five or ten minutes until at least four efficient applications have been made. Used in this way, I have found it a perfectly reliable and efficient paralyzant of the accommodation, even in the presence of high grades of retino-choroidal irritation and general hyperæmia of the eye. But we have not with this drug the excess, or reserve of power to control the ciliary muscle, that is possessed by the other mydriatics named. Every instillation, or at least a sufficient number of them, must be efficient. The cornea must have the chance of absorbing the solution at nearly its full strength; and for that reason the application of the drug must be intrusted only to skilled hands, usually attended to by the surgeon himself.

To bring about simple dilatation of the pupil our choice of the drug will be determined by whether the dilatation is to be long sustained as a measure of treatment, or only temporary as for purposes of diagnosis. In the former case atropine is to be used, in the latter homatropine or cocaine. Atropine or homatropine should be employed in a solution one tenth the strength of those used for paralyzing the accommodation, or even weaker than this. The atropine to be repeated as often

as the pupil contracts again, say once every one, two, or three days; the others, of course, used only the once.

Cocaine, which is of especial value as a dilator of the pupil, is to be used in solutions of the ordinary strength ordinarily employed for producing local anaesthesia of the eye, that is, 2 to 4 per cent. But the instillation must be made at least thirty minutes, often an hour, before the dilatation is desired; the anaesthetic action often having quite passed away before the dilatation of the pupil becomes noticeable, and repeated instillations do not very greatly hasten this dilatation. As a paralyzant of accommodation cocaine has very little power, and by itself is not at all valuable for the purpose. But it can sometimes be advantageously combined with homatropine. Here the frequent repetitions of the instillation, as in the case of iritis, give the advantage of local anaesthesia, greatly lessened resistance on the part of some patients, and prevention of the excessive secretion of tears that follows each instillation of homatropine alone, and by dilution of the solution lessens the intra-ocular effects produced, as well as an apparent hastening of absorption. For this purpose the solution may be made with 2 or 3 per cent each of cocaine and homatropine.

The instillation of a strong solution of any of the mydriatics causes a pericorneal hyperæmia, which, though not serious, is sometimes alarming to the patient or his friends. This phenomenon I pointed out in a paper on homatropine, published in the *Medical News* for July 18. It is especially liable to occur from the use of homatropine, because this is more likely to be used in stronger solutions. The combination with cocaine lessens this tendency to a considerable extent.—*New York Med. Jour.*

EXTRACTION AND AFTER-TREATMENT OF CATARACT.

BY DR. VALUDE.

Translated from the French by Dr. Theo. Franiz for the *Medical Progress*.

The extraction of cataract has been the subject of much discussion. The number of communications brought before each medical congress concerning the technique of the operation, and the different methods of after-treatment disclose the fact that there is quite a variety of operations for cataract extraction, and the subject is worthy of still further consideration. I will endeavor to be brief and will not attempt to make a critical review of the various operations, but will endeavor to give you the most rational and successful method as deduced from my long experience, giving my reasons for each step in the operation and after-treatment. In the first place, I will speak of only the simple forms of cataract, the senile, or hard, and the soft cataract. For this variety simple extraction without iridectomy is the preferable operation. (It will not be necessary to refresh your memory with the different opinions of times past, between the extraction with iridectomy and the simple extraction). Knapp has said time and again that the simple extraction (the modified operation of Daviel) is altogether the safest, best and neatest operation, inasmuch as the physiognomy of the eye is not altered. The only two reasonable objections to this method, viz.: the enclosing of the iris in the lips of the wound, and the frequency of secondary cataract, can be easily overcome by the methods I give further on. The enclosing of the iris in the lips of the wound is very rare after the operation as described by me, with my method

of after-treatment. By referring to my statistics of several hundred cases I find this complication has occurred in only four per cent. of the cases; such percentage constitutes not only very little danger but excels the method of Von Graefe, even his modified method. The danger of secondary cataract is almost abolished by skillful manœuvres in the expulsion, and by the intra-ocular cleansing after the operation.

The secondary operation is, as a rule, followed by good results—if the discussion with needles or the cystotome, or a careful extraction with forceps be done. Knapp has certainly impressed the medical world by statistics recently published on this subject. Knapp's statistics for secondary operations record numbers of eyes not only restored to their normal function, but with elevation of visual acuity. The practice of simple extraction without iridectomy seems to be unquestionably advisable in every simple case, if no other indications are present. I will describe first the operation proper and then the after-treatment. Prior to the operation I never use on the patient either atropine or eserine, the latter I never use, even during the after-treatment, for reasons given later on. Concerning atropine it is true that its power of dilating the pupil facilitates the discussion, but loses its value when the aqueous humor escapes, contraction of the pupil following. I subject the eye to cocaine several minutes previous to the operation. I then proceed to cleanse the conjunctiva and lids with a bichloride solution of 1 to 5,000. This can be done effectually by wrapping a probe with absorbent cotton and saturating it in the bichloride solution. This little arrangement enables me to reach every fold in the mucous lining. It is a well known fact that we can not pay too much attention to the protection against the microbes of the conjunctiva. The lachrymal apparatus must be looked after to see there is no discharge from the sac. The instruments for a simple extraction, as I perform, are a pair of fixation forceps and a Von Graefe knife, whose use requires an assistant to keep apart the lids. As a rule, in ordinary practice I use in addition to the above a wire speculum, a spatula and a curette. The curette I use in order to express

the lens through the incision; the spatula will be useful in the reduction of the iris. These instruments are never boiled or submitted to dry heat, on account of their delicate structure. I render them antiseptic by a bath in a solution of cyanide of mercury 1 to 100; a few minutes are sufficient for thorough antisepsis. This solution is preferable to the bichloride or the borated solutions from the fact that it does not affect the instruments. In ocular surgery the carbolated solutions are contra-indicated on account of their irritating properties; alcohol and hot water are doubtful antiseptics, according to my experience. I am fully satisfied with the cyanide solution for the instruments and the bichloride for the preparatory cleansing of the eye. After thorough cocainization of the eye I proceed to operate. I make my incision at the limbus of the cornea, constituting a flap of about one-third of the circumference of the cornea. This flap is placed in most cases above. I think that the position of the flap on a level with the limbus, neither in front in the cornea nor behind in the conjunctiva is the one which is the least exposed to the danger of enclosing the iris in the incision; it is also the flap in which cicatrization is most rapid. Though I practice the section of the cornea with the Von Græfe knife, I follow the old method of bringing the point of the instrument toward the center of the pupil, so as to open the lens capsule with the point of the knife. After dissection I make my counter-puncture; this constitutes the first two stages of the operation. The rapidity of these steps will determine the success of the operation. The great advantage of the dissection with the knife is that the cystotome is introduced with some difficulty into the eye, may become entangled in the iris and do great mischief. It is an instrument that is very difficult to cleanse. Such being the case, the knife of Von Græfe is the only instrument I dare to introduce into the eye. This kerato-cystotomy being performed, the next step will be the expulsion of the crystalline lens, which I favor by pressure and counter-pressure, either with the fingers, the eyelids intervening, or with a spatula or curette; the soft masses are removed with the curette. If some of the soft matter

should resist the pressure and counter-pressure, its removal can be effected by passing a current of hot borated water into the anterior chamber. I use willingly but not systematically the intra-ocular method of cleansing. After the operation I come to the dressing; I never use eserine after the operation. The dressing for cataract, as I understand it, should essentially be dry and small. A round piece of salol gauze applied directly to the eye, a few layers of antiseptic absorbent cotton, round in shape, and a piece of oil silk will constitute the whole outfit. I do not remove the dressing before the fourth day, even if the patient should complain of some pain. Even in a case where I do suppose that the iris has become enclosed in the wound, I shall not remove the dressing at least before the third day. My reason for this is the imperfect cicatrization of the wound before that time; it may reopen under the slightest disturbance and the iris flow into it. I have seen such a case, where for special reasons, I removed the dressing on the second day; this I took for a valuable lesson in my later operations. On removing the dressing on the third or fourth day the wound has closed and the anterior chamber has become refilled and the eye is free from irritation. I then drop atropine in order to break up all synechiae, then put on a light bandage, which has to be worn for two days. The fourth day the patient is able to sit up, and on the eighth day, if everything has been normal, I dismiss the case. While the first dressing is on I keep the patient in a well-lighted room, instead of condemning him to darkness. This brings us to the conclusion that a great step has been made in the expediency of the operation and after-treatment for the benefit of the patient.

DISEASES OF THE EYE OF MALARIAL ORIGIN.

JAMES L. MINOR, M.D., MEMPHIS, TENN.¹

Of all diseases, there is none more protean in character than malaria; and in this district, where malarial poisoning is so common, it is important that it should be recognized in all of its various forms. And while a proper appreciation of malarial manifestations in the body as a whole is *sine qua non* to professional success, it is further necessary for us to be acquainted with its effects upon special organs. I have selected the eye, and shall attempt to present a brief resume of what is known concerning diseases of this organ of malarial origin; and while I shall present my own opinions, I shall not hesitate to borrow from others who have written upon the subject—and chiefly from a monograph by Dr. C. J. Kipp, of Newark, N. J.

Diseases of the eye arising from malarial infection may be advantageously grouped under three headings: (1) Those accompanying paroxysms of malarial fever; (2) those coming on after such an attack; and (3) those diseases of the eye which may be the chief manifestation of malarial poisoning.

I. We will consider those eye affections accompanying the paroxysm of malarial fever. Photophobia, lachrymation, and hyperæmia of the conjunctiva and of the iris, may accompany the pyrexial stage. Iritis has also been observed. Amaurosis is sometimes seen during the paroxysm—usually in both eyes. It most frequently begins during the chill, and, continuing through the hot, passes off with the sweating stage, and may or may not be accompanied by headache, pain in or redness of the eyes, or by other symptoms. Occasionally the blindness affects only one-half of the field of vision. The ophthalmos-

¹Extracted from Trans. of Med. Soc. of State of Tenn. (53d Annual Meeting).

scopic appearances are negative, and the pathology of this form of amaurosis is unknown.

2. Those diseases of the eye which follow, and are apparently caused by malarial fever, may attack almost any portion of the globe. Dr. Kipp thinks that "the disease most frequently observed in this connection is a superficial ulceration of the cornea." This he was the first to notice, and he thus describes it: "This ulceration of the cornea is commonly first noticed shortly after an attack of intermittent fever, often simultaneously with the appearance of herpetic vesicles on the nose and lips. In a number of my patients who had annual visitations of this fever, each attack was followed by ulceration of the cornea. In all of the cases that have come under my notice only one eye was affected. If the eye is examined shortly after the first symptoms of irritation are noticed, one or two or more slightly raised irregular opaque lines of varying length will be found on different parts of the surface of the cornea. At the same time some circumcorneal injection will be present. On the following day these opaque lines will have increased in length, whilst at the same time the middle portion of the opacity has been transformed into a shallow ulcer. Under favorable circumstances the reparative process is completed in several weeks;" while unpromising cases may remain longer or grow worse. Preceding and accompanying the ulceration there are photophobia, lachrymation, and pain in and around the eye. This form of ulceration of the cornea differs from the vesicular eruptions seen in pneumonia and other febrile diseases in the method of development, as described.

Diseases of the uveal tract (iris, ciliary body, and choroid), while rare, do occur, in the form of serous iritis or exudative choroiditis, and occasionally as suppurative choroiditis, with loss of vision and shrinkage of the globe. Serous effusion into the vitreous has been noted and described by Dr. Seeley of Cincinnati. In chronic malaria, haemorrhages into the vitreous are not infrequently seen; and retinal haemorrhages have also been observed, and a peculiar form of retinitis, resembling

that seen in Bright's disease, has been described. Both optic neuritis and optic nerve atrophy have been observed after intermittent fever, and it is claimed that these not infrequently occur, though I have never seen a case of the kind.

The amblyopia, sometimes seen with intermittent fever of long standing, would seem in many instances to depend upon albuminuric retinitis.

3. We finally pass to those diseases of the eye which may be the chief manifestation of malarial poisoning, and my own observation leads me to think that the most frequent malarial manifestation in the eye is a form of conjunctivitis, which, by the way, is so marked in its peculiarities and accompaniments that its malarial character may be confidently asserted before inquiry is made for it. The inflammation is of a low grade, and it affects both the palpebral and ocular conjunctiva. The discharge is scanty, and is more serous than purulent. The blood vessels are engorged, and the whole appearance is suggestive of a sluggish circulation. There is circumcorneal injection, and there may be spots of abrasion of the epithelial covering of the cornea. The pupils are large and rather inactive, but there is no iritis. The tension of the globe is slightly reduced. The patient complains severely of pain—not so much in the lids as in the globe, and particularly in the supra- and infra-orbital regions. This pain is apt to be worse on certain days or at certain hours than at others, and pressure upon the supra- or infra-orbital nerve causes sharp pain. The entire mucous covering of the lids and of the globe is markedly anaesthetic to superficial irritation. Local treatment in such cases does little or no good, and recourse must be had to the liberal administration of quinine; and to relieve the pain or neuralgia, I have often been obliged to give morphia, and think that I have obtained the best results when it has been combined with gelseminum.

"Intermittent amaurosis has also been observed in cases of latent periodic fevers, in which slight nausea, or some chilliness, or perhaps moderate perspiration, were the only symptoms present. The attacks of blindness, which, according to

Himly, are more frequently confined to one eye in this form of fever, assume quotidian, double-quotidian, or tertian type, although the latter is most common. The duration of the attack varies from a quarter of an hour to ten hours or more. If the blindness recurs every night, this affection may bear some resemblance to night blindness—hemeralopia; and this explains, perhaps, the statement of some authors that night blindness is sometimes caused by intermittent fever. In an interesting case of this kind reported by Staebler, the patient was at first supposed to suffer from night blindness, until some days later the time of the recurrence of the amaurosis was delayed, and an attack of complete blindness in both eyes came on in broad daylight. Quinine speedily cured the attack. This form of intermittent amaurosis is also frequently accompanied by headache, supra-orbital neuralgia, photophobia, blepharospasm, lachrymation, and vaso-neuroses of the eye. In some cases tenderness of the spine was present. The recurrence of the attack was in all cases prevented by sulphate of quinine."—Kipp. (*Memphis Med. Jour.*)

CHLORATE OF POTASSIUM IN PHLYCTENULAR ULCERATION OF THE CORNEA.

BY W. C. BANE, M.D.

It is almost a century since chlorate of potassium was brought to the notice of the medical profession as a remedial agent. In 1795 Dr. Garnet, of England, used it in the treatment of disease. At one time it was lauded as almost a specific in many of the maladies to which mortal man is heir. However, years of clinical experience determined its real value, and it was assigned a place among the topical remedies. Though valuable when administered internally, in some conditions of the system it has its deleterious effects, having already caused forty-seven deaths. Its therapeutic properties may be stated generally as those suggested by its chemical constitution and affinities; as a salt exceptionally rich in oxygen, it has without decomposition, the valuable property, *per se* by its mere presence apparently, of oxygenating or aerating the blood, and so restoring or exalting this inherent quality of the circulating fluid, influencing to a corresponding degree nutrition and functional activity of the various tissues and organs of the body.

In ulcerative diseases chlorate of potassium has been thoroughly tested during the past forty years both internally and locally. Under Therapeutics, in the *North Amer. Medico-Chirurg. Review* for March, 1858, p. 387, Dr. Dethan regards chlorate of potash "as an especial and incontestable remedy in ulcero-membranous stomatitis * * its topical application is sufficient, and in a short time the mucous membrane recovers its normal qualities and functions."

Dr. Gallaher, of Pittsburg (*Am. Journal Med. Science*, July, 1857), lauded chlorate of potash in mercurial stomatitis, stating that, "should there be ulceration of any portion of the mucous membrane of the mouth, I desire a weak solution of the salt to be applied to the denuded part several times a day; generally nothing else is required, the cure being accomplished in a few days." As a local application in ulcers of the lower bowel, chlorate of potassium in solution gives excellent results, ulcers healing rapidly.

I presume chlorate of potassium has frequently been used as a local application in diseases of the eyes, but I have only found one record, that of Dr. Landesberg, of Philadelphia, using it as a topical application in epithelioma of the eyelids.

Ulcers of the cornea, especially the phlyctenular variety, are frequently met with, usually developing as a little papule or pustule on or near the margin of the cornea. They may develop independently or as a complication of some existing ophthalmia or catarrhal affection of the nares. A large percentage of the cases are strumous or scrofulous, consequently suffer from nasal catarrh.

The symptoms may vary as to their intensity, but we usually find photophobia, congestion and pain, the variation in the symptoms being influenced by the number of phlyctenules and the constitution of the patient. Constitutional treatment and regulation of the diet, etc., is invariably needed.

The first use I made of chlorate of potassium as a local remedy in ulcers of the cornea was in a case of serpiginous ulcer in January, 1882. Case—Mrs. S. C. H., æt. 50, constitution feeble. Having exposed herself in doing some outdoor work while the weather was rough, had developed an ulcer in the upper, outer quadrant of the right cornea. When I first examined the eye the ulcer was about 2×3 mm. in size. There was photophobia, congestion of the conjunctiva and subjacent tissues; eyeball, right side of the face and head painful, constitutional remedies prescribed. Locally atropia and weak solution of baborate of soda. One week later the ulcer had doubled in size and depth. Atropia acted as an irritant, mor-

phia disagreed, they were both discontinued. As chlorate of potassium had served me well in ulcers of other portions of the body, I determined to test it on the corneal ulcer, and so directed a five-grain solution to be instilled into the eye, as warm as could be borne, three or four times daily. From the time the chlorate was used the ulcer began to heal. Owing to loss of tissue there remained an opacity. Instead of morphia the patient was given hydrate of chloral with bromide of potassium; though chloral when administered internally acts as an irritant to the eyes in some cases, in this case it did not.

During the past five years of special practice, nearly four years of which I have had charge of the eye and ear department of the dispensary of the Western Pennsylvania Medical College, some fifty-six cases of ulcer of the cornea have come under my care. About two-thirds of these cases were of the phlyctenular variety. The chlorate has rendered good service in different forms of ulcers of the cornea, but rather better in the phlyctenular than in the other varieties. Not all of these cases were treated with the chlorate, as in some the washed mild chlorate was applied, in others the ointment of the yellow oxide of mercury, and in a few weak solutions of the bichloride of mercury.

In the limited experience I have had in the treatment of corneal ulcers and the use of the above remedial agents, my convictions are that the chlorate in about five grain solution used quite warm three or four times daily is the most soothing and heals the ulcers more rapidly than any of the other agents tested. True, the warm water itself is of great advantage, but the chlorate is a valuable addition on account of its antiseptic action. It does not prevent bacterial evolution, but it does retard chemical decomposition of organic fluids.

DR. LIPPINCOTT.—I never use chlorate of potassium in such cases. We have so many old remedies which will answer the purpose. I have found in my experience that the direct application of very hot water to the cornea is a good thing in these ulcers. The one class to which the doctor refers, generally extremely obstinate, I have treated by the direct application

of water at a boiling temperature or steaming. I put a drop of water directly on the exposed cornea so that it steams as it comes out. One drop of the water touches the ulcer, and the effect is marvelous in some cases. The first case I tried it in was a little boy, aged about six years, who had been under treatment for a good while. Treatment had been followed for about three weeks without any material change for the better, and it occurred to me one day to apply the hot water in that way. Before that time could get no dilatation, none whatever, but after the first effort with hot water, the pupil dilated very widely indeed. A good recovery was made. Heat is applied constantly of course, but this was a new application of heat. This hot water treatment, it seems to me, is milder than applying a red hot iron to the ulcer. It seems to destroy less tissue than the hot iron, and it certainly answers the purpose in so far as my experience has gone.

DR. BANE.—I simply wanted to bring this matter out. Hot water is certainly beneficial, as Dr. Lippincott has stated, but it seemed to me that the chlorate shows an advantage, at least it has done so in my experience.—*Cincinnati Med. News.*

INHERITED MONOCULAR MYOPIA.

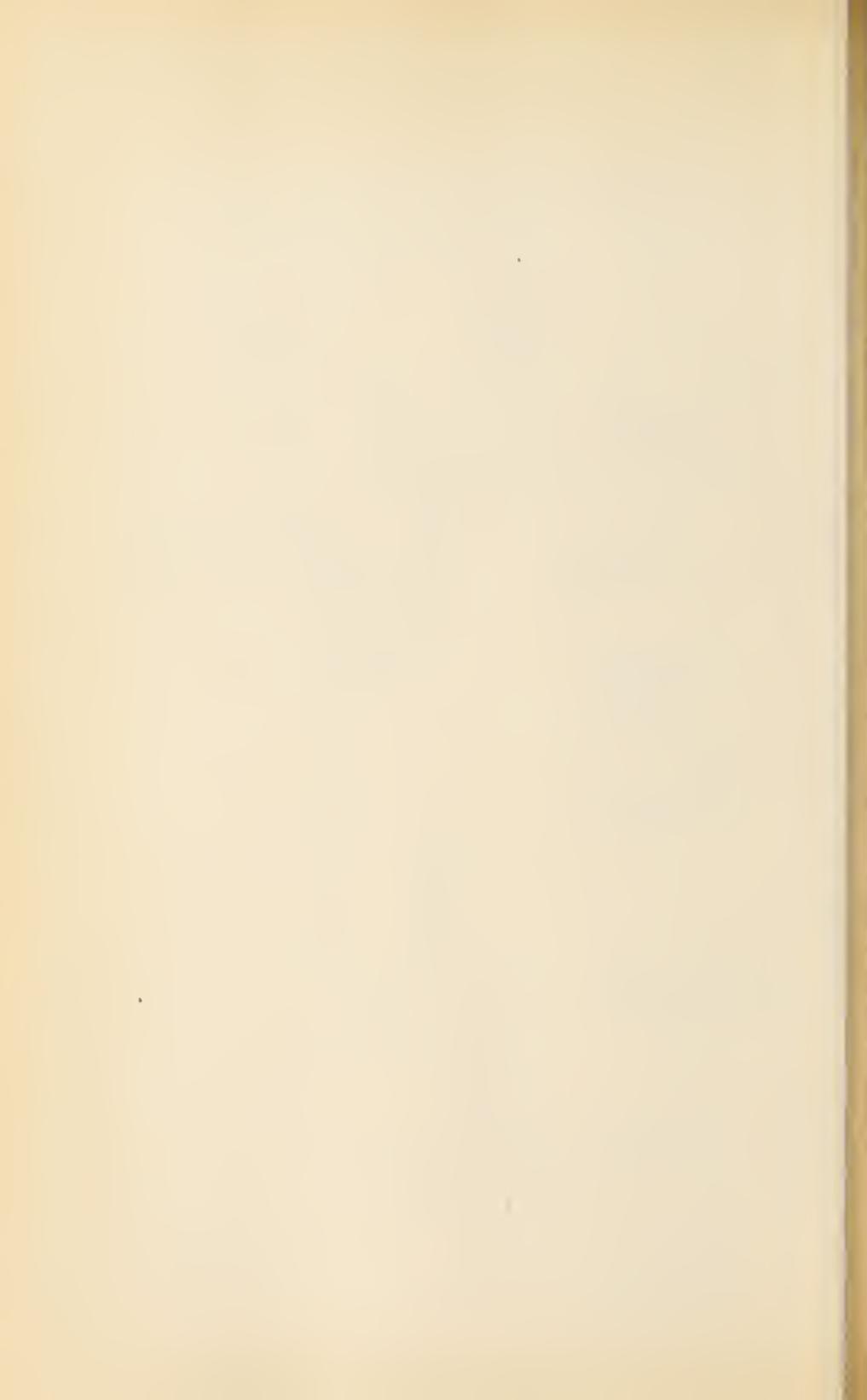
BY DR. THEOBALD.

Dr. Theobald reported a case of inherited monocular myopia, occurring in a lad, æt. 9. As the eyes were not examined in early infancy, there was no positive proof that the ocular defect was congenital, but it seemed highly probable that such was the case. The right eye, which squinted outward to a scarcely perceptible degree, and was decidedly amblyopic, exhibited a myopia of 10 D. There was a general thinning of the choroido-retinal pigment; but no other noteworthy ophthalmoscopic changes were present. The vision of this eye could not be improved by any glass beyond $^{20}/_{cc}$. The left eye showed a slight amount of hypermetropic astigmatism, according to the rule, with $V=^{20}/_{xv}$. The mother of this lad, a lady, æt. 41, had a marked divergent squint of the right eye, which had existed for many years, and in this eye there was a myopia of 13.50 D., with $V=^{20}/_{c}$. The ophthalmoscope showed a rather large, well-defined crescent, with no outlying choroido-retinal changes. In the left eye there was a low grade of compound hypermetropic astigmatism, according to the rule, which had given rise to asthenopia, and for which reading glasses had been prescribed. The occurrence of asthenopia in the left eye of the son was the occasion of his being brought for advice, and in his case, also, a cylindrical glass for this eye was prescribed. Both mother and son depended entirely upon the sight of the left eye in distant as well as in near vision. The parallelism between the condition of the eyes in the two was very striking, and constituted the interesting feature of the cases.

The myopic history of the family in which these cases occurred was also interesting. The maternal great-grandfather and great-grandmother of the lad were both myopic, and perhaps astigmatic, though of this there is no proof. The myopia of the former, as indicated by his glasses, was in the left eye 5 D; in the right eye 5.50 D. The myopia of the latter, tested by Dr. Theobald, when she was over 70 years of age, and when there was some cortical opacity in each lens, was in the left eye $\frac{1}{8}$, in the right $\frac{1}{12}$, myopic crescents being found in both eyes. As a result of this intermarriage of myopes eight children were born. The refractive anomalies which they and their children and grandchildren exhibited were shown in the following table, which Dr. Theobald thought presented strong evidence against the advisability of myopes intermarrying.

TABLE OF CASES OF INHERITED MYOPIA.

GREAT-GRANDFATHER.		GREAT-GRANDMOTHER.	
L. Eye M=5. R. Eye M=5.50		L. Eye M=5. R. Eye M=3.25	
He also had a brother who was myopic and a sister who was very myopic, and a nephew who has been near-sighted for years was recently found to have, also, astigmatism against the rule.		Her mother had a divergent squint, and one of her sisters lost her sight suddenly, probably from fulminating glaucoma.	
DAUGHTER. Myopia of pretty high grade, exact degree, and whether astigmatism was also present, not known.	DAUGHTER. L. eye compound myopic astigmatism. R. eye myopia of high grade. With following correction each eye obtained: V=20°. L=5.25°. 1.50c. 70°. R=8.5.	SON. Myopia of pretty high grade.	DAUGHTER Not known to have had any refractive anomaly.
			SON. Myopia, degree not known; wore glasses; no children.
			DAUGHTER. L. eye mixed astig. R. eye hypermetropic astig. Correcting glasses are: L=1/45°. 1/20c. 135°. R+1/60c. 75°. No children.
			SON. Well-marked astigmatism, but degree and character have not been determined.
			SON. Both eyes myopic; degree not known; wore glasses; no children.
DAUGHTER. Compound myopic astigmatism in each eye, the astigmatism in one eye amounting to about 4D.	DAUGHTER. L. eye compound hypermetropic astigmatism; wears correcting glasses.	SON. Comp'd hypermetropic astigmatism; wears correcting glasses.	DAUGHTER. No evidence of refractive error.
			DAUGHTER. Simple hypermetropic astigmatism; wears correcting glasses.
			SON. L. eye compound hypermetropic astigmatism; wears correcting glasses.
			DAUGHTER. Each eye compound hypermetropic astigmatism; wears correcting glasses.
DAUGHTER. Myopia of high grade in one eye, and of lower degree in other eye, no children.	DAUGHTER. Hypermetropic astigmatism; wears correcting glasses; no children.	SON. Compound myopic astigmatism. Correcting glasses are: L=1/18°. 1/72c. 175°. R=1/18°. 1/30c. 160°.	DAUGHTER. L. eye slight compound hypermetropic astigmatism. R. eye M=13.50.
			SON. Not known to have had refractive error; no children.
DAUGHTER. L. eye M=1/14. R. eye M=1/13.	DAUGHTER. Hypermetropic astigmatism; wears correcting glasses.	SON. L. eye compound myopic astigmatism. R. eye simple myopic astigmatism. Correcting glasses are: L=1/30°. 1/72c. 180°. R=1/42c. 180°.	DAUGHTER. No evidence of refractive error.
			SON. Astigmatism which will soon require correction.
			SON. Compound hypermetropic astigmatism; wears correcting glasses.
			SON. L. eye slight hypermetropic astigmatism. R. eye M=10.
			SON. Two younger children not known to have refractive errors.



ON MINERS' NYSTAGMUS.

BY MR. SIMEON SNELL, SHEFFIELD, ENG.

After reading my paper before the Ophthalmological Society, in 1884, on "Miners' Nystagmus," I wrote in the pages of the *British Medical Journal* a letter, in which I earnestly solicited information from medical men attached to coal pits, and from others who might be interested in the affection, which would tend to elicit the truth whether it supported my observations or not. I concluded by saying: "My desire for facts is not merely to support the views I have expressed, but to arrive at the truth."

I have since availed myself of every opportunity to gather information which would aid in elucidating this, to me, most interesting malady. The result of all my investigations has been to corroborate in the fullest manner the observations I have previously published. It is my purpose in this article to set forth evidence in support of my contention that the prime cause of miners' nystagmus is to be found in the constrained attitude a certain proportion of the workers in a coal pit are compelled to assume at their work, and to show also how the question of safety lamps and illumination can only occupy a secondary position.

My conclusions are derived from an experience of more than 500 colliers, who have at different times been under my care for nystagmus, and I have records of 120 cases with which I propose specially dealing in this paper. Many points of interest and importance will have to be omitted, or mentioned very briefly, for want of space.

For the proper understanding of the subject a knowledge of the working of a coal mine is almost necessary; but, for its

thorough investigation, it may be safely asserted that an intimate acquaintance with the detailed working of a pit and the different ways which men are employed underground is of the first importance. With this end in view, I have not only obtained the assistance of Government mine inspectors, managers, and other officials, as well as the kindly help of many colliers themselves, but I have been down into the coal pits, seen the men at their work, and have by all these means become familiar with the interior of the mine and the various kinds of work in which the men are engaged.

The nature of the peculiar oscillations of miners' nystagmus I have previously described.¹ The ocular movements of a to and fro and rotatory character are associated with apparent motions of objects, and the manner in which the collier so affected sees his lamp dance or spin round, has, I think, a great deal to do with his impression that the "safety lamps" are the cause of his malady. The worker with candles also makes a similar complaint as to the motions of his lights.

The original Davy lamp consisted of a cylinder of wire gauze encircling a light whose illuminating power was considerably below one-fifth of a standard candle. Dr. Clanny introduced the use of glass for the lower part in place of the gauze, and these lamps have been used for many years. Further advances in the illuminating powers of safety lamps have also been made, and the Royal Commissioners on Accidents in Mines, who reported in 1886, speak favorably of the Marsaut lamp. This lamp is one of the four recommended by the Royal Commission, and is largely employed in the Midland district. Such a lamp gives two-thirds of the light of a standard candle, and three times and a half the light of a Davy. In the modern safety lamp the gauze is bonneted by a sheet-iron casing, which not only protects it from strong currents of air, but causes the flame to burn with a steadier and more uniform light. I know the miners object to the shadow cast by the bonnet, among other things, of the safety

¹Ophth. Soc. Trans., 1884.

lamp; but, as a miner, who had one time worked with a Davy lamp, speaking of a modern lamp, said very pithily, "It is daylight to the old one."

The alternative to the use of safety lamps in a coal pit is the employment of naked lights. In some places open oil lamps—"torches," as they are called—are in use; but when safety lamps are not employed, the illumination is generally effected by candles; for ordinary work these tallow candles are from sixteen to twenty to the pound. In the Derbyshire collieries the candles mostly used are eighteen to the pound; they are thin and long, and have a thick wick. The candle is fixed in soft clay, which makes it easy of attachment to the place where it best throws a light on the work. The influences of currents of air on the unprotected candle will be apparent, and in strong currents it becomes necessary for the light to be shielded either by a prop or other protection, and the quantity of diffused light is materially diminished.

A miner naturally, I think, prefers a candle. I have seen them both used in a mine. The candle is easier to handle, can be stuck in almost any position, and exposes a naked flame with a more diffused light. Many persons, however, have an erroneous idea of the comparative light-giving power of a safety lamp, and are apt to suppose that it refers to such candles as the miner uses, whereas the comparison is to the light emitted by a standard candle.

Through the kindness of a friend I have been able to obtain an analysis, by an expert, of miners' candles which were submitted to him. All I can do here is to say that no two burnt with regularity or similarity, that candles 18 to the pound emitted light varying from 36.80 to 73.60 per cent of the standard candle; and candles 16 to the pound 61.53 to 77.24 per cent of the light of the standard candle. It was only by snuffing and nursing the thick end of a 16 to the pound candle that a light was obtained exceeding that of the standard.

It has been asserted that nystagmus is now more common than it was formerly. I am not aware of any statistical information on the subject. As far as my personal experience

goes I certainly meet with more cases. This is not to be wondered at, considering it is well known that I have paid special attention to the subject. I am not aware, however, that these miners' cases have increased in any very undue proportion to the greater number of eye patients which come under my notice. A knowledge of the disease, however, has become more diffused among medical men. It is important, also, to remember the large increase in the numbers working underground. In 1869 there were 300,000, and in 1890, 1,06,812.

The advocates of the safety lamp theory, in insisting on the greater prevalence of nystagmus, appear to overlook the improved illuminating power of modern protected lights. An increase under these circumstances is rather an argument against the prominent place it is asserted that safety lamps occupy in the causation of the malady. As long as I have been acquainted with nystagmus, I have been equally familiar with the opinion of the collier that it is "all the lamps." There is a rooted prejudice, which sometimes is a hindrance to properly investigating a case; but, on the other hand, I have seldom failed to convince a miner coming for treatment that there was a more potent cause at work than the mere employment of his safety lamp.

It is often alleged by the advocates of the safety lamp theory that men suffering from nystagmus become improved when they leave a pit where safety lamps are used and obtain employment in a mine worked by naked lights. In view of the fact—which I shall be able to establish—that nystagmus is by no means infrequently met with in candle lighted pits such a statement is not of much moment. Several times the tale has been reversed. Men working in safety lamp pits have become worse on going elsewhere where naked lights were used, and others have failed to improve. The statement is frequently made, however, and therefore it may be well to analyse it somewhat. The essential thing is to be clear that the work pursued under the two varieties of illumination is as nearly identical as possible. This is of vital importance. A change of work would also have been beneficial in a safety lamp pit. Refer-

ence will be made further on to the fact, borne out by several cases, that a man who has suffered from nystagmus may continue his work in the pit as long as he discontinues the kind of employment which I shall show to be acting so prominently in causing this affection.

I have investigated cases of alleged improvement by simply changing from one pit to another, or from safety lamps to naked lights. Last year a collier, the subject of well-marked nystagmus, told me that his brother had suffered, had gone to work in a "candle pit," and had got better. It turned out on investigation that formerly he had been a stall man doing "holing"—work prejudicial, as will be presently shown. I went down into the pit, saw this man at his work, and now, as expected, it was different; crooked down on his haunches, with head upright, he was able to use his pick more directly forwards; he was, in fact, engaged at work which I should have permitted him to have done in a safety-lamp pit. No such cases of alleged improvement can be accepted unless the evidence is clear and distinct of a continuance of employment similar with naked lights to that followed when using safety lamps.

I come now to deal with the presence of nystagmus in men employing naked lights. The following interesting instance is among my cases:

G. H., came to the Sheffield General Infirmary on November 25, 1850. He was suffering from particularly well-marked nystagmus, and had been compelled to leave his work. His age was 38; he had been employed in coal pits for twenty-four years. At first he worked with candles, then for fourteen years together with safety lamps. During that time he experienced no ocular discomfort. For the last three years and a half he had been working in another pit, with candles and not lamps. His work had been the same as it was when using safety lamps. He had been a coal getter; to use his own words, he would "drive a heading and get the coal down by holing three or four feet under"—that is, undercutting the seam of coal. He dates the earliest symptoms back fifteen or eighteen

months, or, in other words, not until he had ceased the use of safety lamps and been employing candles for more than two years. He continued his work, however, until four days before first coming to me, when he was compelled to desist. There is thus no doubt in this case about the nystagmus developing during the time he used candles.

In the districts around Sheffield safety lamps are very generally used. The pits in which candles or naked lights are employed are generally small ones, and the number of colliers engaged is small. The proportion also of the naked light miners to the general body of colliers in this district is a low one. One of my cases, a youth, developed symptoms of nystagmus after working with "torches." He had previously worked with safety lamps without discomfort; but after three months with a "torch" he developed the characteristic dancing of lights and sought my advice. I pass by without mentioning other instances to give a brief account of a most interesting series of cases, which were employed at a Derbyshire naked-light colliery. The man to be first mentioned having paid me a visit, promised if I would go over, to get together other men whom he knew to be suffering from nystagmus. This he did at very short notice, and the cases were examined by me in company with Mr. Hayes and another medical friend.

A man, *aet.* 31, had worked in the pit since the age of 6. He was a stallman, doing holing and other work. This man had never used safety lamps. He had suffered from symptoms for eighteen months, and had been away from work on and off a great deal during the last twelve months, and had not worked for five weeks at the time when first seen by me. Including this man there were six at this time off work from his pit (in which the number employed was 350) in consequence of nystagmus. They were mostly well-marked cases. One had never used safety lamps; another had only worked with them for six months five years ago; a third had only used "lamps" for twelve months seven years ago, and he had worked in a pit for thirty-nine years; another had been engaged in a coal pit for forty-six years, and, except for an occasion; 1 day when

there was gas about in the pit, he had never worked with safety lamps. The same remark applies to another who had worked for thirty-seven years in a pit, and the sixth had never used "safeties" at all. With one exception all were stallmen, getting coal and doing holing; that is, out of a total of 150 stallmen, five were off their work in consequence of nystagmus, and were examined by me. The sixth was a loader, also, however, doing coal getting.

Six other cases were also seen by me. One had been employed in a pit for fourteen years. He had always used candles except two years ago, when he employed lamps for three months, and also for an occasional day when gas was about the workings. He was off work in consequence of nystagmus, and had been so for a week. Another man had worked in a pit for twenty-one years. He had never been obliged to leave his work, always used candles except for eighteen months, when he worked with safety lamps. This period ceased eighteen months ago, and it was clearly shown that it was not until he had returned to the use of candles for three months that he felt any discomfort as to his eyes.

Another man, *aet. 45*, had just returned to his work. He had suffered on and off for sixteen years; he had worked in a pit for thirty-two years; for twenty-seven or twenty-eight years of this time he had used candles, but at different periods he had used lamps, the longest term for three years. He was a decided partisan as to the injury from lamps, and I found it impossible to say with the use of which mode of illumination his symptoms commenced. One thing, however, was quite clear—that with naked lights he was no better, for he had just returned to work after an absence of three weeks.

Another man worked at first with naked paraffin lamps, then for four years with safety lamps, and for the last fifteen months with candles. As far as I could gather, his symptoms commenced when using the safety lamps. He was still employed, and I do not think he had at any time left his work for nystagmus. The ocular movements were well marked, and work in the candle pit had clearly not improved him.

Another man who was present was employed in a safety lamp pit. He had worked fifteen years with candles, and later with safety lamps for ten years. His symptoms were quite recent, but he had not left work.

A twelfth case was seen at this visit. He was a "deputy," and reference will be made to this interesting case further on. He worked in a candle pit but employed a safety lamp, as his work was to examine the workings for gas before the men entered the pit.

I had another opportunity, in company with my friend Dr. Cocking, of examining most of these men; in fact, some I saw on three occasions. I saw, also, two other cases. One was a "deputy" similar to the other already mentioned; the second was a man, *aet.* 28, who had worked in a pit for eleven years. Up to twelve months ago he used safety lamps; since then he had been working with candles. The symptoms appear to have commenced about the time of ceasing the use of safety lamps; he has, however been getting worse since using candles. Besides these cases I found that the occurrence of nystagmus was well known among these men in candle-lighted pits. A father had a son afflicted, and a son a father; and further definite evidence was given me of the existence of several other cases which these men knew of, and which would have been gathered together for my inspection had circumstances permitted.

The information gained by this investigation is most valuable, and its bearing on the relation of safety lamps to the affection most important. Eleven cases were found among the candle men: Some had never used safety lamps at all, and the keenest advocate for the theory attributing the malady to their use could, in those other cases in which the use had been so little and so very occasional, hardly venture to suggest that they in any way owed their nystagmus to this cause. In the judgment of most it will be, I think, evident that the existence of such cases as I have mentioned absolutely prevents the acceptance of the employment of safety lamps as a prime cause, and they demonstrate clearly that nystagmus

does occur, and that frequently, in circumstances where such a cause is wanting.

Further evidence is furnished by the two cases to which reference is now made. For the present it is merely necessary to say that they were not practical colliers, but were engaged at the bottom of the shaft as "onsetters" attending to dispatching to the surface the tubs of coal. Now, anyone familiar with a coal pit knows that the bottom of the shaft is well lighted. In some collieries the electric light is employed, in others gas. In one instance large oil lamps were used; and in the other, as the patient said, "there is plenty of light from big paraffin lamps."

Here, again, nystagmus is found in circumstances in which the illumination can hardly be found fault with. A medical friend informs me of another similar case, but I have not yet seen the man.

In this connection may be mentioned the case of a young compositor working under ordinary illumination (gas), who developed nystagmus, vertical in character, the causation of which can, in my opinion, be traced to his work.

I have now, I think, advanced evidence proving not only the existence of nystagmus in the miners employed in naked-light pits, but also in circumstances in which the illumination can hardly be found fault with, and rendering it impossible for the employment of safety lamps to be regarded as the prime cause. My object has been to demonstrate the existence of nystagmus in men employing naked lights. It is on this point my views have been assailed, and I have given proofs for my opinion as to its occurrence under the circumstances named. I am not now concerned with the greater or less frequency of nystagmus in pits using safety lamps or naked lights. I have, in allowing imperfect illumination a secondary place, deemed it not unlikely that, other things being equal, the disease would be more frequent under the worst conditions as to light. I am bound to say, however, that the relatively large number I found off work at the naked-light colliery was more than I was prepared for.

We must now pass on to consider in what way the nystagmus of miners is produced. I have no doubt the prime cause of nystagmus must be traced to the peculiar circumstances under which a collier's work is accomplished. As long ago as 1875² I drew attention to this, and stated that "it seems to me this disease occurs chiefly, if not entirely, in those colliers who are obliged to do their work in the pit whilst lying on one of their sides." In a paper before the Ophthalmological Society in 1884 I further elaborated this contention of the relation of position at work in causing the disease. All tended to show that nystagmus was associated with a particular class of colliers performing a particular kind of work. The kind of work alluded to is called "holing." Among other evidence advanced in the paper mentioned was on account of a visit to a coal pit made by me to verify, by actual observation of the men at work, the impressions gleaned from clinical experience. To put it briefly, the men whom one expected to find suffering from nystagmus were so afflicted, whilst others pursuing different kinds of work were unaffected. My further observations will be found to support the views I have previously set forth. Further experience and a better acquaintance with the working of coal mines have shown me that in others besides those "working on their sides" (holing) an attitude is assumed necessitating a somewhat similar position of head and eyes, and cases will be mentioned in which nystagmus has occurred in men so employed.

The workers in a pit are of various kinds. Thus there are laborers (datalers), whose employment is to attend to the roads, to keep them in repair, etc.; trammers or haulage men, who push the tubs or corves, full or empty, along the rails; there are also drivers or pony boys. Now all these men in pits, where protected lights are used, employ safety lamps, and thus work under similar conditions of illumination to others employed underground; yet it is not among these that nystagmus is found. Such is my opinion, and it is amply corroborated by others.

²Lancet, 1875, vol. ii, p. 81.

Dr. Tatham Thompson,³ speaking of the South Wales collieries, mentions the "absence of nystagmus among the laborers and haulers." Mr. Jeaffreson, of Newcastle,⁴ also says "it is equally certain that it is amongst this class (colliers) confined to those that hew coal." Nieden, after examining the large number which he did, found nystagmus confined to the hewers. Dransart is of a similar opinion.

The men employed in a pit who generally receive the name of colliers or miners are those engaged in coal-getting; on their labor all the others engaged depend. At the coal face we shall find men engaged in coal-getting and others employed in filling the corves or tubs with the dislodged coal; these latter are called "fillers" or "loaders;" they are usually paid by the day, and if there are no corves to fill they not uncommonly lend their aid to the coal getters. Nystagmus is exceptionally met with in these "fillers."

The man engaged in winning the coal and the manner in which his work is accomplished possesses the most interest for us. His business is to detach the coal from the coal seam generally by holing underneath the seam. To do this he has to work in a peculiar position. He sits down with his legs crooked up, lying almost on his side, and strikes with his pick at the bottom of the coal, his object being to undermine or undercut the seam. He will clear away the coal thus to a height of 18 inches or 2 feet, and then, as he gets deeper in, he gets his body under the coal, lying on one or other of his sides. The distance he may undercut the coal varies considerably. The process is called "holing," and sometimes he may undermine the seam of coal for 2 or 3 feet to as much as 6 or 7 feet; this is called "bottom holing." There are besides this, however, two other varieties. "Middle holing" is carried on in the middle of a seam, just where shale or friable coal may occur; "top holing," as the name suggests, is done at the top of the seam. In all these varieties the pick is swung to

³Lancet, vol. i, p. 311, 1891.

⁴British Medical Journal, 1887, vol. ii, 109

and fro in a horizontal line. The coal is afterward detached by wedges, or in some pits by explosives. Other men may be engaged in what is called "cutting the headings." This work will be done directly forward with the pick swinging in a vertical line; the man will generally be kneeling or crooked down when he does it, but with the head straight; these men are not, I think, liable to nystagmus.

When holing is necessary, about 30 per cent of the work at the coal face is holing, being equivalent to about 20 per cent of the work underground.

I will now advance evidence showing the intimate relation of holing to miners' nystagmus. In 1883 I visited a large well-ventilated pit in which several hundreds of men were engaged underground. I have described this visit in detail in my paper before the Ophthalmological Society in 1884. I was taken to the coal getters. Three sets of these were examined: (a) Those who were engaged in "cutting the headings," working with the pick directly forward in the manner already described. In none of these men was nystagmus found. (b) Then I was taken to those engaged in holing or undercutting the coal, and four of the six men working at the places I went to suffered from nystagmus. The two who were unaffected were young men. These were the particular class expected to be afflicted. (c) Trammers and men otherwise engaged in the pit were examined, and nystagmus was not found among them.

My visit showed me the importance in investigating this question by a personal acquaintance with the interior of a pit. Such a visit goes far to convince one also that the position assumed by the miner must be an important factor in the causation of nystagmus. Dransart is of the opinion that one visit is enough to comprehend the part played by work at the vein.

I have made a calculation that at one time or another more than 500 cases must have passed under my notice for treatment. I lay particular stress upon this, for my clinical results are based on cases that have sought me—a very different

thing from cases which one has sought for himself. I have made no calculation of, and do not now take into account, a considerable number that I have casually noticed. At the time I commenced this article 14 cases were on my books at the Sheffield General Infirmary. For our purposes now I have collected together all the records preserved of cases. Some are under date several years back, and others, the majority, are recent, within the last year or eighteen months, and they vary much in completeness. The number of which I can get records is 120. All of these have been under treatment except 14, which, as already mentioned, were examined when investigating the workers with naked lights.

Taking now the 120 cases, and analyzing the work performed by them, I find 112 were coal getters and doing "holing" more or less, 3 (there was also a loader included in the naked light series) were "fillers," which should be added to the first group, because, as I shall show, though not regular holers or coal getters, men of this class do work of this kind; two were "deputies," two were "onsetters" at the pit bottom and one was an "engine man," a term which as will be seen presently very imperfectly describes his work. My experience teaches me that the summary as given above would be true also of the cases of which I have preserved no records; besides those mentioned, I do not recollect any other exceptional cases.

Before considering some of these cases in detail it may be well to say a few words on the method to be pursued in investigating the kind of work performed by a miner suffering from nystagmus.

For years it has been my practice to avoid leading questions as to the kind of work pursued and to get the patient himself to demonstrate as much as possible his attitude at his work, the man going down on the floor and illustrating his mode of work; in a doubtful case he has always put himself in the attitude he would assume at his occupation. By adopting this method I have not only gone to the bottom of my cases as far as the kind of work pursued is concerned, but I have ascer-

tained that in other kinds of work in the pit a position of the head and eyes is also assumed, which no doubt acts as prejudicially as does the constrained position in holing. Thus I learnt that a man suffering from nystagmus, who was a "holer," did also work which he called "clodding," that is, clearing the clod or rubbish off the top of the coal. It is a position not unlike "top holing." I had a photograph taken as he represented himself at this work. His height was 5 feet 9 inches, and he worked under 5 feet, and he did so as upright as possible with his head on one side.

The association of nystagmus with the particular kind of workers which my cases have demonstrated has not escaped the notice of others. Dransart, whose painstaking observations in this affection are well known, alludes in a foot-note attached to his paper in the *Annales d' Oculistique*, 1877, vol. ii, p. 121, to the man working in the shallow inclines constantly lying, and adds: "We ought to note this fact that all our workers attacked with nystagmus worked in these inclined bearings."

More recently Zieminski,⁵ who "has made a special study of nystagmus in England, attributes this muscular anomaly to the constrained attitude of the work of the miners, their look being forced to direct itself obliquely above either to the right or to the left."

In my paper before the Ophthalmological Society I quoted Nieden as assigning the cause of nystagmus to the use of "safety lamps." He kindly wrote pointing out that I had not quite correctly interpreted his views, as he had also found nystagmus in pits where the ordinary lamps were used. He said further: "In all my papers about nystagmus I stated as the *first, prime*, cause of this affection the particular kind of work which the *hewers* had to do in holing the coal in a stretched position of the body, head and eyes."⁶

The pathology of miners' nystagmus is similar, I believe, to

⁵ Analyzed in Rec. d' Opht., 1889, p. 637

⁶ The italics represent underlined words in the original.

writers', pianists' or telegraphists' cramp. It is a local affection, and is the result of prolonged strain in an unusual and constrained position, chronic fatigue results, and atony of the muscles being induced, oscillation of the globes is caused.

Dransart⁷ held that the disorder was due to the fatigue induced in the elevator muscles in consequence of the cramped position of the miner occasioning strain and a constant upward movement of the eye. I have elsewhere⁸ fully discussed these views.

If we now consider the position of the miner engaged in "holing" we shall, I think, conclude that the position is not sufficiently described "as the constant upward movement of the eyes." There is something more, and whilst Dransart's⁹ explanation accounts for many of the symptoms present, it hardly meets the rotary movements which are seldom absent.

The constrained position of the miner in holing has been already mentioned. It is work common not only in this country, but on the Continent. The French name—*travail à col tordu*—expresses its cramped nature. A man lying on his side engaged in "holing" either whilst making the hole or whilst continuing his work under the coal, will of course fix his gaze at different parts according to where it is necessary to strike, for his eyes will follow his pick point, but the tendency will be for the gaze to be directed more or less obliquely. I have satisfied myself on this point times without number. The miner will lie on his side, sometimes the left, sometimes the right, as is most convenient; his legs will be crooked up, his head thrown back and flexed more or less on the shoulder beneath, and the eyes will have the direction as just mentioned.

The physiology of the ocular movements supports my contention, because when we incline the head to one side or the

⁷Annales d' Oculistique, 1887, vol. ii, p. 128; 1882, vol. ii, p. 150.

⁸Ophth. Soc. Trans., 1884.

⁹In a recent paper before the French Ophthalmological Congress (Rec. d' Ophth., May, 1891) Dransart speaks of "the upward and oblique gaze" of the miner. Out of 179 cases of nystagmus he says 92 used safety lamps and 87 naked lights.

other by turning it on its antero-posterior axis,¹⁰ rotation of the two eyes upon their antero-posterior axis takes place probably by the instrumentality of the oblique muscles.

A miner working on his left side will be using in the left eye the superior rectus, inferior oblique, and internal rectus; and in the right the same two first named muscles, but substituting the external for the internal rectus. If he be on the opposite side the arrangement will be reversed. The to-and-fro movements met with in nystagmus are thus accounted for by the weariness of the outer and inner recti, the rotatory by the inferior oblique, and the superior rectus aids here or in occasioning the vertical movements.

Before leaving this portion of my subject, I may mention as worthy of note the ready manner in which discomfort is occasioned and nystagmus rendered evident, even in cases that have improved by rest or change of work, by assuming before one the position required in holing. Also the oscillations become perceptible on directing the eyes upward¹¹ and particularly obliquely upward, when otherwise they would be less evident or pass unnoticed. Some men are accustomed to do their work with one side down more than the other, and not infrequently the oscillations are more marked on looking to one side, and it is often possible thus to tell the patient on which side he is most accustomed to work. I find 10 such cases in my record, but the condition was not always looked for.

Among the 115 cases that I have classified under the name of doing holing are included three "fillers." These at first sight might appear as exceptions. Nystagmus is infrequently met with in fillers, and these are the only instances I recollect at any time coming under my observation. A filler's work is to fill the corves or tubs with coal. He, however, aspires to be a collier, and is not unwilling to lend a hand at coal getting—in fact, when he has no tubs to fill he is expected to do so.

¹⁰Carpenter's Physiology, p. 896.

¹¹The motions cease on looking downward.

One of these cases in particular I very carefully inquired into, and went some distance, in company with Mr. Wightman, assistant house surgeon at the Infirmary, to interview the men with whom the young man worked, and learnt that he never passed a day without holing. As to the others I also satisfied myself.

For many years I have been on the look-out for exceptional cases. I have asked my friends in colliery districts to send me any they might observe. The five to be mentioned now are the only ones I have notes of or recollect. Of these, two were "deputies." Until quite recently I had not seen cases from this class of pitmen; it is, however, easy enough to understand why they should suffer. I found both instances when examining cases from a naked-light pit. The duty of a deputy is to enter the pit and examine the workings for the presence of gas before the men go to their work. He has also to ascertain carefully the condition of the roof. They are selected for this post for their steadiness and intelligence. I will give particulars briefly of one of these cases:

C. W., æt. 32, has worked in a pit twenty-two years. He has worked at coal-getting and holing, but for the last eight years he has been a "deputy." He previously used candles, but, though still working in a candle-lighted pit, it is necessary for him to employ a "safety lamp" for detecting gas, etc. He works a nine hours' shift; that is, he is in the pit at work for eight hours. For about four continuous hours he is in the working places from 4 to 6 feet examining the roof. On finding out that he was suffering from nystagmus and learning he was a deputy, I at once asked him to put himself in the position for examining the roof. He placed himself with head on one side, and the eyes directed upwards and obliquely, as expected. There were several colliers in the room, and they agreed as to the correctness of the position he assumed. I have since had his photograph taken, and obtained the agreement of a fellow deputy and several of his fellow workmen to the correctness of the picture. He is a man of about 5 feet 7 inches in height, and in the photograph he is represented in

the position assumed by him for examining the roof under 5 feet. It must be recollected that in the pit his head must be on one side, and if he raises it he will strike it against the roof. His symptoms date back to about twelve months, and for five weeks in the autumn he was off work. The oscillations were well marked. He finds stooping and looking up makes his eyes bad, and he tries to keep them directed downwards as much as possible.

The second patient had also used naked lights until he became a deputy; he has had symptoms for two years.

Both these men, it will be noticed, had previously been engaged in "coal-getting and holing" and using naked lights. There is no evidence of their having suffered during this period from nystagmus, and I accept the cases as developing the malady during the time they have been deputies, and I think the explanation I have given of muscular strain is the correct one.

The next case is also one of considerable interest. He was a man, æt. 28, when he came to me in December, 1882. He had had symptoms of nystagmus for two years, but particularly for the last three months. He was an engineman at the bottom of the pit. My notes made at the time were sufficiently complete, but the characteristics of the case were unusual, and I determined to try to find him again. I did so, and he came to me quite recently. The facts are briefly these: The name given to his employment is misleading, and although the place where the engine was situated is lofty (20 feet), he had a lot of work to do attending to pipes under 5 feet and less—his own height was about 5 feet 10 inches. He had to lie on his side attending to the pipes, and his work necessitated much turning of his head on one side, very similar, as he said, to that assumed by a man "holing." He worked with paraffin lamps, but when it was necessary to go to the donkey engine, which was some distance away, he used a safety lamp. Acting on my advice (given in 1882), he had ceased to do this kind of work, and obtained employment on the pit bank. He still, however, has to go into the pit frequently, and still uses a

"safety lamp." He travels with it 1,000 yards down an incline, and 500 more to the workings (donkey engine). He does no work now necessitating such a position as was formerly the case, and, though he still uses a safety lamp a good deal, he is perfectly well, and has been so for several years. There are no oscillations of the eyeballs discoverable by any means, nor has he had any symptoms since shortly after changing his work.

The remaining two cases are of peculiar interest, and I must direct special attention to them because they worked in a good light, and the question of safety lamps or imperfect illumination has therefore no place. They are both occupied at the bottom of the shaft; they have been previously mentioned, but it will be necessary now to go a little more into detail.

The light at the bottom of the pit shaft will be recognised to be good. As before mentioned, in some pits it is lighted by the electric light or gas, and in others by large paraffin or oil lamps.

One of these patients was a man, J. H., who came to me in October, 1890. He had suffered from the lights dancing for about three or four months; nystagmus was present, but not very markedly. He worked at the bottom of the shaft as an "onsetter." There is, he says, "plenty of good light from oil lamps." He has never worked at the coal face or as a practical miner.

I find he is "head hanger on," his work being to ring off, that is, when the tubs are full he signals to the top, and whilst these go up the cage comes down with the empty tubs. He stands at his work, and has to look up to the cage ascending and coming down, his head and eyes being frequently turned in an obliquely upward direction, with his head on one side. Other men shove the tubs on to the cage. The facts here given as to this man's work were supported by three other patients from the same pit, who constantly saw him at his post. Besides this, as the patient came up to one, he did so with his head on one side.

The other, T. M., was a man, *æt.* 28. He has nothing to do with coal getting. He says "There is plenty of light from big paraffin lamps." I need not further detail his case.

Now in these two cases the "light" question does not come in. There are many occupations above ground pursued in no better or even in worse light. I think the explanation of the causation of nystagmus given is correct. Viewing the five exceptional cases together, it is clear that there are instances of men working underground who suffer from nystagmus, and though not working at coal getting, are pursuing their avocations in a manner that is not irreconcilable with the views I have set forth as to the prime cause at work in occasioning the disorder.

I must pass by many interesting points connected with treatment, and allude only to some of the results, which lend valuable aid in support of the contention as to the part played by the miner's manner of work in causing his malady.

Formerly it was my practice, after a period of rest in severe cases, or more quickly in slighter ones, to advise the patient to seek some work outside of the pit, on the bank, or to obtain some other employment. Increased experience has taught me that leaving the pit, except temporarily, is unnecessary. I lay particular stress upon this.

Included among the 120 cases with which I have dealt in this article—or really 106, because 14 were not actual patients, but were included in a special inquiry as to naked lights—will be found several instances which will bear out the statement that a change of work has been followed by improvement, and they have been enabled to continue working underground. All that has been necessary is that any occupation causing such a constrained position as holing should be discontinued; safety lamps have been used as before.

The following is a particularly interesting case. W. B., *æt.* 29, came to me at the Infirmary on November 11, 1890. He has worked in the pit for twenty years, and has used safety lamps for fourteen years. He has been suffering from symptoms for about the last two or three months. Quite recently

he became worse, and was compelled to leave his work, and, thereupon, came to me. He was similarly afflicted five years ago, and was under my care then, and recovered. On my advice he obtained work outside the pit. He continued at this for twelve months, then he went into the pit, looking after the roads and ponies. Then for six months he did getting coal down after it had been holed by others, and removing the "spraggs" or wood supports. He did all this work with safety lamps, be it remembered, without finding it, as he says, trying to his eyes. He thought he might return to his old occupation of holing. He did so, and at the end of four months he was compelled to leave his work, and again seek my aid, and this notwithstanding a respite of getting on for five years since he had done holing before. He was a bad specimen of nystagmus. By treatment, at first at my hands and then at the medical side of the Infirmary under my friend, Dr. Cocking (for he had also cardiac disease) he has again made a most satisfactory recovery. He will soon be fit, if he wishes it, to obtain employment underground again, but he will not do holing. When the man first came to me five years ago he was a "lamp man." Is it to be wondered at that he is now convinced that to the constrained position necessitated in holing is to be attributed his disorder?

It is unnecessary to give details of other cases. One of the most recent is a man I saw at Christmas last, of whom my friend, Dr. Scott, writes: "S. has changed his work to 'dataling'; he lays rails down for trams, and although he is working in quite as bad a light—ordinary lamps (safety)—still his eyes are not so bad."

In conclusion, let me say that it has been impossible in the space at my command to have either dealt fully with the points mentioned, or indeed to bring out all the evidence and facts, which in the course of a long investigation have accumulated in my hands. Many important facts have been omitted; so much, indeed, is this the case, that it is my purpose shortly to publish in book form my observations in a complete manner, and to illustrate by engravings and photographs the vari-

ous kinds of work pursued in the pit. For the present, I think I have brought forward sufficient evidence to show that not only is nystagmus met with in the workers with naked lights, and that by no means infrequently, but, further than this, instances have been given of its occurrence in men, not practical miners, pursuing their work in a good light; that it is impossible to regard, therefore, the use of safety lamps as a sole, or even essential, element in causation, and that even imperfect illumination may be absent. On the other hand, the evidence given as to the men seen at work in the pit, the analysis and consideration of the cases, supported as it is by the views of Dransart, Nieden and Ziemiński, point to the position assumed at work as the prime element in causation. It has been further shown how such a theory is consistent with the symptoms present, and that the results of treatment so based are eminently satisfactory.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

NYSTAGMUS IN A COMPOSITOR.

Mr. Snell (Sheffield) brought forward this case. The patient, æt. 21, had just completed his apprenticeship, and was engaged on the staff of a large daily paper. He came under observation on October 17, 1890. His work for some months had been heavier than usual, the hours from 7 P.M. to 3 A.M. Two days before coming to Mr. Snell he returned home from work, went to bed, and rose as usual at 12 (noon). Then he noticed objects moving up and down, with some giddiness; no pain in head, nor sickness. The nystagmus was found to be vertical, and the movements were rather jumping; there was quivering of eyelids. He was carefully examined for any central or other lesion, with negative results. The absence of any assignable cause and the resemblance in some particulars to miners' nystagmus suggested inquiry as to the way his work was performed. He was visited at the printing office, which was of course well lighted, and it was found that when he

looked up to his "copy," instead of raising head and eyes together, he elevated the eyes only. This was fully described. Anyone trying it would find out how tiring it was. Other men at work raised the head with the eyes. The patient gradually recovered, oscillations disappeared, and he returned to work on December 30. He now worked with comfort, having adopted the suggestion as to raising his head at the same time that he looked up from the type to the "copy." Quite recently he had developed "compositor's cramp" in the right hand, and was incapacitated thereby from doing his work. Mr. Snell alluded to his views as to miners' nystagmus having for its prime cause the constrained position in which coal getters worked. He mentioned instances occurring in men (not practical colliers) working at the pit bottom in good light, whose gaze was constantly turned up as the cage ascended and descended. Nystagmus, Mr. Snell thought, would probably be found associated with other occupations occasionally. Writers' cramp had been followed by the recognition of many similar conditions. The mention of this compositor's case would perhaps lead others to recognize more the connection of nystagmus with occupation.—*Brit. Med. Jour.*

A BLACK SPOT AT THE MACULA LUTEA IN A CASE OF EMBOLISM OF THE ARTERIA CENTRALIS RETINÆ.

BY DR. T. INOUYE, TOKYO, JAPAN.

Miyabé, a girl, æt. 7, consulted me October 19, 1890, with the following history:

Three years previously she had suffered from blenorhœa which had caused blindness in the left eye. At the same time she became emaciated, and exhibited a morbid appetite, devouring greedily mud, linen, etc.

October 17, on rising in the morning she found that she was completely blind, the right eye also having become affected. The patient felt well in other respects, and there was no heart lesion. In the right eye all perception of light was lost, but the exterior of the eye appeared normal. With the ophthalmoscope it was at once noticed that the usual transparency of the retina was wanting. In consequence of this the pale optic disc was not sharply outlined. The arteries and veins were not clearly distinguishable, and it was difficult or almost impossible to say which were the arteries and which the veins. All the veins were narrow and thread-like, showing in the middle a barely perceptible light-reflex. The arterial current was interrupted and slow. Between the separate blood-cylinders the vessel tube appeared as a bright thread-like line. At the macula lutea a small coal-black spot was seen in place of the usual cherry-red one, so well known in embolism.

This color interested me, since in the Japanese I had never before found the spot black, but always red. The Japanese are strongly pigmented, and it is probable that the black choroid shone through the thin fovea centralis, although the child was not unusually dark.

I have found no case similar to this in literature, and I am curious to know whether in cases of embolism in the negro the macula lutea appears black or has its usual cherry color.
—*Sei-I-Kwai Medical Journal.*

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ORIGINAL ARTICLES.

SOME SYPHILITIC LESIONS OF THE EYE.

The Brows, Lashes, Lachrymal Apparatus, Lids, Conjunctiva, Sclera, Cornea and Orbit.

BY H. V. WURDEMANN, M. D., OF MILWAUKEE, MEMBER OF COMMITTEE ON
OPHTHALMOLOGY AND OTOLGY.

It has been urged that the ocular lesions occurring in syphilitic subjects are due rather to the effects of debility and altered nutrition than to the action of the specific poison. Although it is possible that some eye affections happening in the course of constitutional syphilis arise through a lowered condition of the bodily functions, the same as in other cachectic states, still, the weight of evidence from the researches of observers in the last decade is in favor of a specific cause acting locally through vascular mediation. A diagnosis of syphilis is usually made only upon the co-existence or history of a number of symptoms peculiar to that diathesis. Yet, even in the absence of other corroborative evidence, some of the following conditions of the organ of vision are strong indications, if not positive proof, of venereal disease. The imprint of syphilis may appear as any form of inflammatory action in any of the structures of the eye. Lesions occur at all periods of acquired syphilis and are common in congenital disease. As the skin and mucous membranes are peculiarly susceptible to luetic inflammation, wounds and bruises or ulcerations are apt to become infiltrated and are very slowly healed. [Bumstead.]¹¹ The syphilitic dyscrasia is prejudi-

cial to the success of operations and sad disappointments are met with in these patients. [Noyes.]⁵²

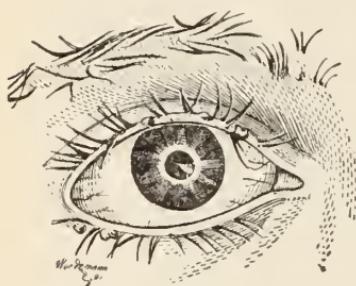


Fig. 1.—*Alopecia Ciliaris et Super-*
ciliaris Syphilitica, "Signe
d'Omibus."

The eyebrows and lashes are sometimes involved in syphilitic tarsitis and in the alopecia of secondary disease. [See Figs. 1-4.] They often undergo a marked change particularly prominent in young people. Instead of being thick and regular, the hairs become thin and stick out in all directions, with bald patches in places.

These changes constitute what is known as the *signe d'omibus*, as a patient is thus rendered diagnosable even in a public vehicle. [Fournier]²⁰ The illustration is from a sketch of a patient in the Fuchs clinic in Vienna who had other secondary manifestations. [See Fig. 1.]

In inherited disease the eyebrows as well as the lashes sometimes fall out. [Smith.]⁶³ A certain number of cases of lachrymal disease are due to syphilis, and where inflammatory affections of this apparatus resist the usual treatment, the cause will frequently be found to be a luetic taint, and the local disease will not be eradicated until the constitutional complaint is attended to. In a few instances the disease is confined to the mucous membrane and the submucous tissue whence it has been propagated by inflammation of the Schneiderian membrane, giving rise to a simple stricture of the lachrymal duct. In the majority of cases the bony wall of the periosteum becomes affected by caries. The symptoms are then those of a severe dacro-cystitis and result in abscess or fistula. Considerable deformity may be produced by destruction of the nasal bones or by ectropion of the lower lid from the cicatricial process.

The following case is typical: A married woman aged 33 came to me for phlegmonous inflammation of the lachrymal sac which had existed about six

months. The disease was on both sides and was accompanied by caries of the lachrymal and nasal bones. She had *ozæna* for more than a year, and the nasal cavities were in bad shape from ulcerations and caries. There was a coppery discoloration of the skin of the face and neck, enlargement of the cervical lymphatic glands and nodes on the long bones. No history of contagion was given. The local affection was surgically treated and the general condition was attended to with marked benefit.

Dr. Chas. A. Oliver,⁷⁵ of Philadelphia kindly sent me the following report of prelachrymal abscess occurring in a boy aged 13, the sixth child of syphilitic parents, presenting characteristic lesions of hereditary syphilis. He complained of recurrent swellings at the inner angle of the eyes just over the region of the lachrymal ducts which had first appeared on the right side four years previously and on the left side for three weeks only. The lower canaliculi were slit and the swellings incised showing no connection between them. Probes passed into the abscess revealed diseased bone on the right side. Free drainage, antiseptic washing of the cavities in association with the internal administration of iodides and inunctions of mercury relieved the active symptoms in seven months, the nasal portion of the right lower lid being dragged toward the resultant cicatrix.

The only case of syphilis involving the lachrymal gland was reported by Chalons¹³ in 1859, and as no cases have been reported since, its authenticity is doubtful.

"This was in a man and occurred as a secondary symptom in conjunction with iritis and an exanthematous eruption. These glands became swollen and pushed the upper lids forwards and downwards, forming ptosis. There was no pain and the swellings subsided under mercury."

Taylor⁶⁸ mentions several suspicious cases which yielded to iodide of potassium but the diagnosis was in doubt.

The skin of the eyelids may be involved in the same form of lesions as on other parts of the body. Chancre is seldom met with. Of 1646 cases of indurated chancre reported by Sturgis,⁶⁵ the lesion was situated on the eyelid in but six. The chancre may occupy any part of the external or internal surface, and may be superficial or extend to all the tissues of the lid [Loring].³⁷ It most frequently occurs on the delicate skin of the margin, beginning as a papule which soon breaks down leaving the usual excavated ulcer with a hard base. "The only guide to a certain diagnosis is the rapid development of an adenitis in the preauricular and the submaxillary glands." [Zeissl.]⁷⁴

I have seen but one chancre of the eyelid which occurred on a negro man in Dr. J. Ford Thompson's⁶⁹ clinic in Washington, some years ago. Unfortunately I have no notes of this case. Bull,⁸ Zeissl,⁷⁴ Mackenzie,⁴¹ and others have reported cases. Chancroids have been seen upon the lids by Galezowski,²⁵ Hirscher,²⁸ and others.

Through the kindness of Dr. F. W. Marlow, of Syracuse, N. Y., and through that of Mr. J. B. Lawford,³⁵ ophthalmic surgeon at St. Thomas's hospital, [Moorfields] London, I am enabled to give the following case and illustrations. (See Figs. 2-3.)

A married woman aged 50 had been nursing a syphilitic child, not her own. She had noticed a sore upon the right lower lid two or three weeks before coming under observation. The lower lid was much thickened, with a brown scab, with no evident aperture beneath the scab. The conjunctiva of the lid had a grey color, but no pellicle could be peeled off. The preauricular gland was enlarged. Two weeks later the submaxillary gland was enlarged and the

preauricular was greater. The ulcer on lid was extending. The sore gradually got softer and extended inwards.

About six weeks from her admission to the hospital, there was a rash



FIG. 2.—*Chancroid of the Eyelid.*
(From Photograph.)

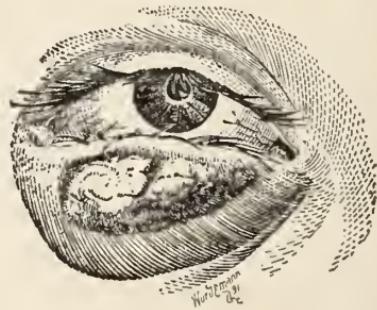


FIG. 3.

on the body and extremities. Sore throat was complained of and the fauces were red. In about eight weeks she left the hospital with the sore healed but with other symptoms of constitutional disease. She was treated internally by mercury and by *lotio nigra* to the sore.

The syphilides present no distinctive features in this locality.

I have noticed the papular eruption on the eyelids of luetic infants, and in some instances they have been red and swollen. In a case of secondary syphilis in a male negro the pustular syphilide affected the skin of the face and eyelids.

Condylomata of this locality are with difficulty to be differentiated from epithelial cancer. [Walton.]⁷⁰ In syphilis the

skin is darker, the edges softer and less elevated, and the surrounding skin not so glued down to the parts beneath as in cancer. They sometimes cause complete destruction of the lid, as in a number of cases collected by MacKenzie.⁴¹

Loring³⁷ reports such a case in a lad, aged 19, affected with syphilis of the lachrymal passages and nodes on the tibia. His disease was traced to a chancre contracted three years previously.

The tertiary lesions of syphilis affect the skin of the eyelids as well as that on other parts of the face, and as this form is characterized by extensive destruction of tissue, the deformity produced may not be inconsiderable. Single tertiary ulcers have not been observed to occur alone, but are accompanied by ulceration of the skin of contiguous areas.

I remember a patient in Prof. Neumann's⁵¹ clinic in Vienna who had lost the greater portion of the skin of his face, through tertiary ulceration, and with it that of the eyelids.

Hutchinson³¹ speaks of meeting with a form of blepharitis in congenital syphilitics which was characterized by the formation of small ulcers at the ciliary margin of the lids.

Infiltrations into the subdermal areolar tissue do not always ulcerate, but may remain for a long time as nodules, and bear close resemblance to chalazia. These soon yield to internal treatment. [Loring.]³⁷

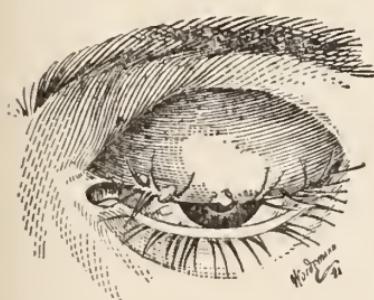


FIG. 4.—*Titisars Syphilitica.*

Inflammation of the tarsal cartilage is generally due to syphilis. It is caused by inflammatory infiltration of the cartilage itself, and is usually confined to that structure. The lid may be greatly thickened without the skin being involved, though the latter is generally reddened. It is not specially painful except in cases where abscesses form. The latter point and break at the edge of the lid. The affection is usually followed by loss of the cilia.

I have had the opportunity of seeing two cases of this somewhat rare disease. The one at Dr. F. B. Loring's³⁵ clinic, in a mulatto girl aged 13, the subject of congenital syphilis. In the same eye an obstinate interstitial keratitis existed, which afterwards left a large leucoma. The enlargement of the tarsus and the ptosis was permanent, and treatment was of little avail. [See fig. 4.]

The other case was at Dr. Swan M. Burnett's¹² clinic, in a negro girl aged about 15, who was at the same time attending the venereal clinic of Dr. Thompson,⁶⁹ for some "blood disease," as she said. This was probably a secondary lesion, although in this case I cannot vouch as to the existence of syphilis.

Actual syphilitic lesions of the conjunctiva are rarely seen, those cases that have been reported being mostly condylomata. It may be the site of a luetic manifestation in any stage of the systemic disease. I have noticed in several cases of chronic catarrhal conjunctivitis, where the patients acknowledged syphilis, that topical applications did little good, but when the general effect of the specific treatment was apparent, the local affection was much improved.

A man, aged 24, came to me, complaining of failing vision, specks before the eyes and smarting lids. He had a chancre eight months before, followed by slight alopecia, sore throat and a papular syphilide of short duration. He had been under specific treatment, but now was taking a simple tonic. I found a moderate degree of conjunctival irritation with the usual secretion of mucous, which was the cause of the *muscae*. Astringents were applied with but little effect and it was only upon the renewal of the specific treatment by his physician, some weeks later, that any progress was observed in the local disease. A careful ophthalmoscopic examination was made, but no other lesion could be recognized. The patient suffered, some six months later, from an attack of chorio-retinitis in which the sight was at one time reduced to perception of light, but under strong specific treatment he recovered full vision.

This subject has received close attention in the last few months. Alt² reports four cases of chronic and recurrent hyperæmia of the bulbar conjunctiva which he believes were due to syphilis. Goldzieher²⁶ describes two cases as a lymphadenitis of the adenoid tissue of the conjunctiva and figures the disease as being granular. Macauley⁴⁰ and Sattler⁵⁷ have described similar cases, the latter claiming that the granules consist of endothelial cells and are not trachomatous. His description answers to that generally given for follicular conjunctivitis. [See recent paper by the author.]⁷²

An obstinate type of catarrhal conjunctivitis is sometimes met with in specific cases where iritis has been present. In such cases there is no certainty that the local lesion is the result of syphilis. [Bull,⁸ Mauthner,⁴⁰ Lang,³⁴ Alexander.]¹

In infantile syphilis a blenorhoea is sometimes present which is distinct from gonorrhœal ophthalmia, but which like the latter may result in corneal ulceration and even loss of the eye.

Although the primary lesion is usually situated in other localities, yet it has been found on the ocular membrane, the virus having been carried thither by the finger or even by the act of kissing. Chancre of the conjunctiva has much the same appearance as that of the prepuce, having the same excavated, indurated edges and the characteristic coating of pultaceous exudation. The diagnosis is made by proof of the infection, and by swelling of the neighboring lymphatic glands, the preauricular, the parotid and the sublingual. The implication of the preauricular gland is regarded by authorities as a certain sign of syphilis. [Zeissl,⁷⁴ Noyes⁵³ et al.] The locality of the lesion is usually at the ciliary margin of the lids or in the cul-de-sac.

The most recent case of which I can find any mention was reported in 1890 by Marlow.⁴² A widow, aged 47, came to him with a swollen and painful left upper lid which had existed for one week. Near the inner canthus a deep, circumscribed induration could be felt. The lid could not be everted and overlapped the lower. The preauricular gland was much enlarged. Ten days later a ragged ulcer could be seen in the palpebral conjunctiva which extended from the margin of the lid at the inner canthus to the retrotarsal fold. The pain was slight, the preauricular gland was larger and the glands under the left side of the jaw were swollen to size of a small orange. The fauces were congested and there was a slight eruption on the nose. The patient's daughter was the mother of an illegitimate child, the subject of severe inherited syphilis, covered from head to feet and down to the finger tips with a papulo-squamous eruption. The grandmother had been taking care of the child, whose fingers had come in contact with her eye and thereby infection had taken place.

Bull⁸ describes the following: A young man came to him with an inflamed and swollen lower lid. He denied any infection and had never had symptoms of a venereal disease. On evertting the lid, deep in the cul-de-sac, about a quarter inch from the external canthus was an ulcerated surface with a hard base, covered by a grayish, pultaceous matter, the induration extending for some distance on every side. The ulcer was irregularly oval, about a half inch in its longest diameter and extended upwards into the thickened ocular conjunctiva which was intensely congested. The preauricular gland was enlarged and tender; later the symptoms appeared in the parotid and submaxillary glands.

The sore healed in three weeks, and nine weeks later a roseola and other symptoms including monocular iritis appeared.

Boucheron⁶ and Schmidt-Rimpler⁶⁰ reported cases in which the means of contagion was a kiss from the lips of a person with mucous patches. The former speaks of a physician who inoculated his eye by rubbing it with his finger, to relieve itching while examining a syphilitic. Fuchs²² has seen [sic] cases in infants where the disease had been communicated by the nurse moistening the child's lids with her saliva, which is a custom among the Austrian peasantry. Interesting cases have been reported by Galezowski,²³ Desmarres,¹⁴ Sturgis,⁶⁵ Dietlen,¹⁵ Nettleship⁵⁰ and others.

The secondary lesions that appear on the conjunctiva are less rare and numbers of cases have been reported. The diagnosis is established, as in the case of the chancre, by the fact of infection, by the implication of the neighboring glands and also by the co-existence of general disease. They are coincident with the appearance of syphilides and affections of the mucous membranes. Eruptions may appear as in the following cases:

Sichel⁶¹ describes a syphilitic papular eruption of the conjunctiva in a man aged 23. He saw it at the beginning of the disease when no photophobia or pain was present. There was limited congestion of the conjunctiva between internal and external recti of the left eye. In the center of the patch was a small reddish-yellow tumor, the size of a grain of wheat. Ten days later the swelling was $1\frac{1}{2} \times 6\frac{1}{2}$ mm. The cornea was not involved. The surface of the tumor was excoriated and in the depressions was a little mucous. The patient gave a history of syphilitic infection some weeks before. The case was seen by Ricord⁵⁶ and Fournier²¹ who diagnosed a papulo-ulcerating syphilide of the conjunctiva. Under mercurial treatment the eye became normal in a month. There is no mention of subsequent symptoms.

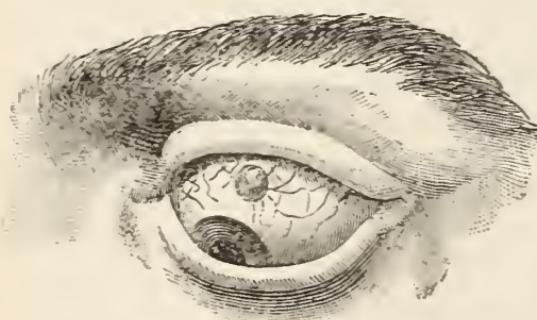


Fig. 5.—Syphilitic Papule of the Conjunctiva. [Savy] A cure was obtained after three weeks specific treatment

Savy's⁵² case [see Fig 5] had an obstinate lenticular eruption about the body. The eyelids were red and inflamed, the lashes had fallen off and there was a papular eruption on the under surface of the lids. A syphilitic papule had developed on the ocular conjunctiva 3 mm. above the

Condylomata may appear as tawny, slightly elevated, moist surfaces, similar to the same lesions on the penis. These show a tendency to ulcerate as in other localities, and have been taken from their appearances to be chancroidal in nature.

A typical instance has been described by Bull⁸ as follows: A young man came for iritis and, upon further examination, was found to have a general papular eruption. He gave a history of chancre four months previous which was followed by roseola and sore throat. Two days later the upper lid of the left eye was swollen and tender. On evertting it a vesicular elevation of the tarsal conjunctiva over center of lid was seen. The next day this was quite resistant to the touch. The process extended steadily until six days later the signs of a mucous patch were unmistakable. It was oval, somewhat over half an inch long, its greatest diameter corresponding to that of the lid, but not reaching the ciliary margin. It had the reddish-gray moist surface we are accustomed to see. This subsequently ulcerated, becoming red and painful, extending superficially and acquiring an offensive discharge. It eventually healed, although very obstinate, the resulting cicatrix producing slight entropion.

The tertiary form of conjunctival lesion occurs as a gummy infiltration. This may be either circumscribed or diffuse. Although gumma of the contiguous structures is very common, that of the ocular membrane, limited to its tissue proper, is relatively rare. In gumma of the sclera or ciliary body the conjunctiva is usually implicated.

Among a number of reported cases, I select the following as an example: Briere⁷ describes a man aged 25, who had the initial lesion four years before, followed by a papulo-tubercular syphilitide which lasted a long time. Then appeared tertiary symptoms as exostoses and periostitis, intense cephalalgia, facial palsy and a disordered mind. Caries of the facial bones followed, and later came a marked injection of the conjunctiva of the right eye which was accompanied by intense photophobia and lachrymation. On lifting the lid and causing the patient to look down, there was seen a tumor in the conjunctiva of a yellow color and firm consistence, about the size of a large bean, six mm. from the limbus, between superior and external recti. Under antisyphilitic treatment the growth diminished and one month later there was but a slight thickening of the membrane at the diseased spot.

The rare form of conjunctival discoloration or blotch described by Smeel⁶ and France²² was probably of the same gummy nature.⁸ It was very obstinate, slightly raised above the conjunctival surface and showed no disposition to ulcerate.

These secondary and tertiary forms of conjunctival disease are interesting in that they sometimes occur as isolated symp-

toms of constitutional syphilis. "The patient may have been free from all symptoms of disease for several years, when suddenly the conjunctival lesion makes its appearance, runs its course, is healed, and again the patient is free from all symptoms." [Soelberg Wells.]⁷¹

Lawrence³⁶ cites the case of a man who had a large dirty-white ulcer on the tarsal conjunctiva of the upper lid, and who had no other symptoms of syphilis for three or four years. Bull⁹ describes a similar case.

I can find no mention of congenital syphilis of the conjunctiva beyond the infantile blenorhœa already described and one case of ulcer reported by Lawrence.³⁶ Chancroidal ulceration was reported by Hirscher²⁸ in 1866 and by Galezowski²⁵ in 1872. These are the only cases and were possibly gummatous.

The sclera is occasionally involved in acquired syphilis. In the secondary stage we may find an episcleritis which resists local treatment, but which is otherwise difficult to differentiate as a specific process. [Sturgis.]⁶⁴ It is accompanied as in the non-specific form by pain and photophobia. The affection begins as a rose-colored or violet patch of injection at the outer part of the eyeball between the insertions of the recti muscles. This is slightly elevated and involves solely the episcleral tissue and the overlying conjunctiva. Spots may appear at any part of the anterior sclerotic which may coalesce until the greater part of the structure near the cornea is affected. [Bumstead.]¹¹

Scleritis profunda is a much more serious affair, although in a slight form it only appears as an injected violet colored patch on any part of the sclera, unaccompanied by pain or photophobia. Other cases begin with pericorneal injection which gradually extends back until the whole anterior zone of the ball is involved. The iris and ciliary body become involved and the cornea gradually grows opaque in a characteristic manner, the base of the opacity resting upon the sclera, its apex projecting forward to the center of the cornea.

[Hyde.]³² Interstitial or deep scleritis may undergo resolution or the patch may degenerate into an ulcer with irregular edges and soft, grayish floor. The disease is very obstinate and may be fatal to vision. I have had no experience with such cases.

Gumma of the sclera begins as an interstitial deposit with elevation, redness, etc. It spreads to the deeper structures and leads to destruction of the eye. In the latter stages it is accompanied by violent pain. The sclera is usually implicated in gumma of the ciliary region.

It has been my fortune to see a case of scleral gumma of the ciliary region whose history showed that it had begun as above described. This was in a married woman aged 30, who gave a specific history. The eye was enucleated by Dr. Coe, of Washington, with my assistance, on account of the uncontrollable pain. Upon examination of the specimen the disease was found to have involved the sclera principally although the ciliary body was implicated and the lens and cornea were opaque. [See fig. 6.]

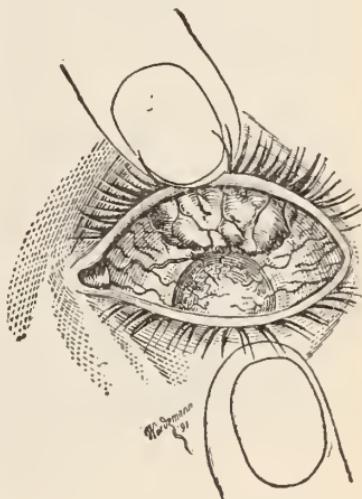


Fig. 6.—*Gumma of Sclera and Ciliary Region.*

The following cut is from the report of a similar case, described by E. G. Loring and H. C. Eno in 1874.³⁸ [See fig. 7.]

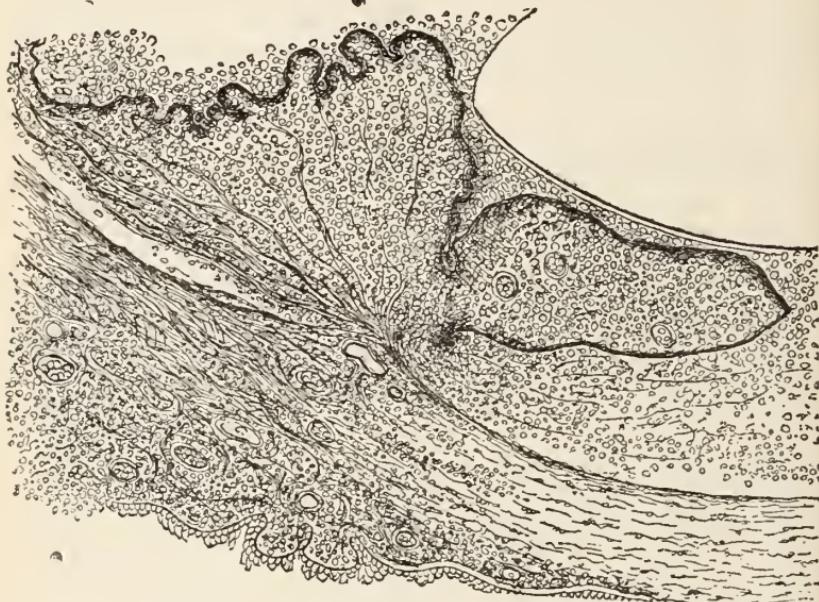


Fig. 7.—*Microscopic Section through Ciliary Region, Showing Episcleral and Ciliary Tumors, etc. [Loring and Eno.]*

The primary lesion on the cornea is unknown. Its tissues may be affected in either the secondary or the tertiary stage of the disease, or it may be the site of congenital syphilis. Although the cornea is the seat of a number of non-specific diseases, its venereal lesions are few and, with the exception of interstitial disease, are with difficulty traced to a specific cause. As before observed traumas are apt to go badly in these cases, the same as in other systemic states in which the bodily nutrition is lowered. Wounds are more apt to suppurate and ulcers to prove intractable. As most of the important operations are done after a corneal incision, this factor should be taken into account. The cornea may become implicated in syphilitic infants who have blenorhæa. [Fuchs.]²⁴ Cases of keratomalacia or general breaking down of the cornea are apt to occur in children with this dyscrasia. [id.]²³ It

seems that the general cachexia has more to do with the corneal destruction than the syphilitic taint. [Dimmer.]¹⁶ The cornea may be implicated in gumma of the contiguous structures. Keyes³³ states that it may become vascular in cases of conjunctival condylomata. Marlow⁴⁴ observes, "in some cases of specific iritis, after the acute iritic symptoms had passed off, the development near the center of the cornea of a single, round, soft-edged spot of grayish haze, apparently in the substantia propria, the cornea finally becoming quite clear. In one case there was a stage of keratitis punctata before clearing took place." So close an observer as Dr. Marlow can hardly be mistaken, yet his description might apply to the change in the posterior epithelial layer of the cornea which is frequently noticed in cases of iritis.

The most common syphilitic lesion of the cornea is a deep seated inflammation of the substantia propria. It is claimed by many authors that parenchymatous or interstitial keratitis is in the greater majority of cases of specific origin.

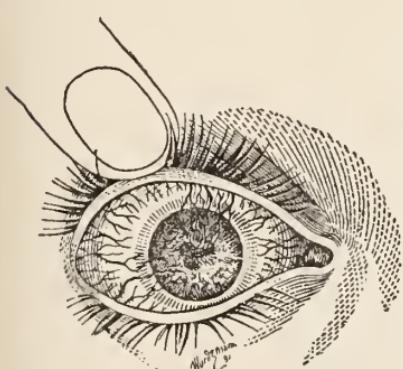


Fig. 8.—Interstitial Keratitis.

Nettleship⁵⁰ says: "I have found other personal evidence of inherited specific trouble in 54 per cent. of my cases of interstitial keratitis, and evidence from the family history in 14 per cent. more; total 68 per cent., and in the remaining 32 per cent. there have been strong reasons to suspect it."

In 51 cases of Horner's,²⁹ 26 had hereditary syphilis, 2 acquired syphilis and in 10 syphilis was strongly suspected, making nearly two-thirds of the number. I have seen typical cases of interstitial keratitis occurring in scrofulous subjects and the same fact has been noticed by others. At present writing I have two such cases under treatment in whom syphilis can be excluded. Arlt⁴ distinguished a parenchymatous keratitis due to syphilis, another due to scrofula and a third as due to malaria. The malarial form is however a true keratitis postica. [Noyes].⁵² The superficial form of keratitis more often co-exists in that due to scrofula than in the luetic disease.²⁴

Specific keratitis usually attacks both eyes, although worse in one than in the other. A year or more may intervene between the recovery of the first eye and the implication of the second. Two types are distinguished, the vascular and the avascular. [Fuchs].²³⁻²⁴ The attack begins in haziness of the cornea, either in the center or at the sides. In the vascular form the pericorneal vessels soon become enlarged and the inflammation extends to the episcleral vessels. The cornea clouds and presents the appearance of ground glass in spots where the

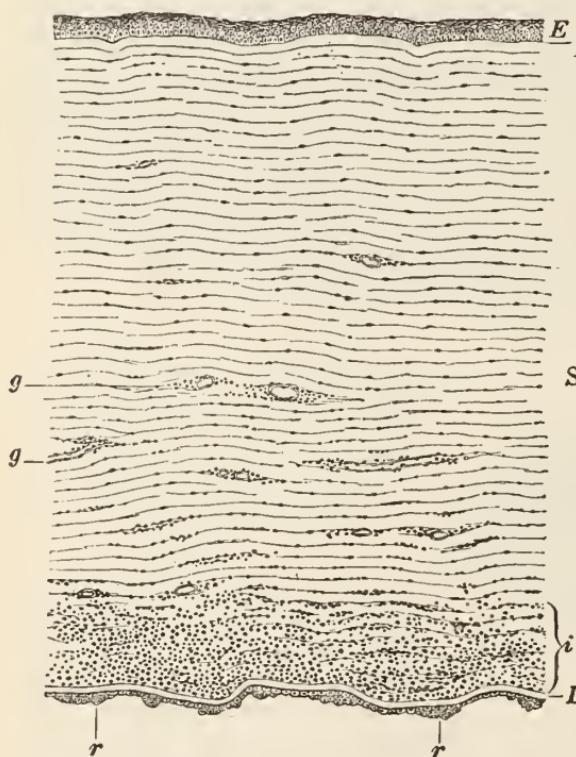


Fig. 9.—Section of Syphilitic Cornea. [Fuchs.]

The corneal stroma *S.* is infiltrated, the opacity beginning in the central and being thick in the posterior layers, *i.* The layer of Descemet *D* is thrown in folds and the posterior layer of epithelium is thickened by the deposit of round cells in spots. Blood-vessels *g g* traverse the stroma. The anterior epithelium *E.* and Bowman's layer *B.* are normal.

infiltration is in *B* greater quantity. The pericorneal area becomes somewhat raised from the engorgement. Some of the vessels are continued into and on the cornea, forming leashes and spots of superficial keratitis which are very obstinate, remaining a long time after the diffuse disease is cured. [Hirschberg].²⁷ The infiltration is principally confined to the posterior part of the substantia propria

[see Figs. 8-9.], the spots being dirty yellowish in color.

The aqueous humor becomes cloudy and deposits are formed on the posterior elastic lamella, which is not directly implicated. The posterior layer of epithelium is generally involved when iritis occurs, as this layer is a direct continuation of the outer membrane of the iris. The uveal tract is always implicated and synechiæ, exclusion or occlusion of the pupil may form. In severe cases the whole cornea may be red and the conjunctiva chemosed. After recovery the tissue of the iris may be so atrophied as to be translucent. [Keyes.]³³

The visual acuity is much more diminished than one would judge from the corneal opacity. It may be reduced to recognition of objects held close to the face or even to perception of light, when the cornea is clear enough for the pupillary area to be clearly distinguished. In the mild form there may be but slight photophobia and lachrymation. When the disease is more extensive these symptoms are very severe, and the corneal tissue may become softened, yielding its curve so that under the pressure of the lids a considerable degree of astigmatism is found after recovery. The intraocular pressure is generally lessened, although in rare cases it may be markedly increased, giving rise to irregular astigmatism or even staphyloma. Such is a picture of the vascular form.

In other cases the cornea rapidly clouds over, with but slight circumcorneal injection, which rapidly subsides leaving a dense nebula. In the avascular form the uveal tract is implicated but is only, as a rule, hyperæmic. There are spots of denser infiltration as in the vascular form. The infiltration results in a deposit of white connective tissue in the corneal layer, which may be permanent. [Fuchs.]²³ After the periecorneal injection had disappeared it may be again made visible by a somewhat rough handling of the eye. In both the vascular and nonvascular forms the disease in its declining stage resembles the keratitis punctata presently to be described.

Parenchymatous keratitis may be due in some cases to acquired syphilis. [Noyes,⁵³ Fuchs,²³ Marlow.⁴³] It is

usually the vascular form and is associated with iritis. It has been called keratitis syphilitica punctata profunda from the fact that the infiltration is greater in spots although diffuse opacity also exists.²⁷ It is to be differentiated from the keratitis punctata superficialis, which is a herpetic eruption [Fuchs],²⁸ by the cause and locality of the lesion, which is easily seen upon oblique illumination.

In the healing stage of hereditary keratitis the cornea presents the same punctate infiltration. [See Fig. 12.] In congenital disease the lesion is essentially chronic, although acute exacerbations may occur, while in acquired syphilis the symptoms pursue a more acute course. Authorities²⁸⁻⁴⁹⁻⁵² agree that girls are more subject to the hereditary disease than boys, the proportion being about two to one. The manifestation usually occurs at puberty, although cases show themselves from the ages of seven to twenty. Noyes⁵² reports a case at thirty-three. I have noticed, when the disease occurs earlier than puberty that, after recovery from the first attack, a second will come at that time and a third about the age of 20. Hutchinson³¹ says that second attacks are very rare.

"In all cases we have to do with unhealthy subjects, notwithstanding the fact that many do in certain particulars show signs of blooming health. Not a few young girls with unmistakable signs of hereditary syphilis have plump and well rounded forms and rosy cheeks and declare that they feel entirely well." [Noyes.]⁵² I think that the specific history of many patients may be traced back through their parents to their grandparents. Mooren⁴⁷ has reported several cases which he believes to be derived from their remote ancestors. Thus, in doubtful cases, a clear diagnosis can not be formed. Specific treatment should however be instituted, when often the diagnosis will be confirmed by the reaction of the medicine. The symptoms that can commonly be elicited in patients with parenchymatous keratitis that point toward hereditary syphilis are the following:

I. A peculiar physiognomy and cranium; the upper jaw is flat, the bridge of the nose flat or sunken and the forehead prominent. There is often a blenorhoea of the lachrymal passages or a hypertrophic rhinitis or ozæna or other change in the nose, the result of previous syphilitic coryza. [Bosworth.]⁵ Often the intelligence is not normal, the patients being either too precocious or too backward.

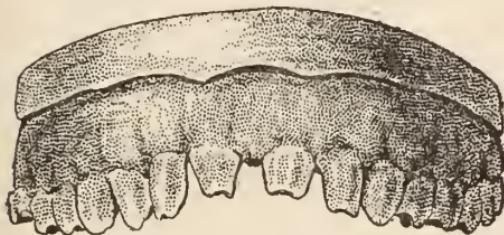


Fig. 10.—*Hutchinson's Teeth.*

toward the median line. They are commonly of bad color, but may even be white. Sometimes the incisors of the lower jaw or the lateral incisors of the upper are also affected. The cut [see Fig. 10] is from a plaster cast of a syphilitic and is typical. The vault of the palate is narrow and roof of mouth is a high arch.⁵² Although I have seen teeth of this description in children in whom specific disease was negatived, yet they are very common in congenital syphilites.

Scrofulous or rachitic teeth are frequently met with and are very different from the above. They are notched in several places in the distal ends which are very thin and sharp. They are ridged transversely and are much discolored. [See Fig. 11.] The vault of the palate is commonly broad and flat. Such teeth, however, may be due to arrested development from disease occurring at the time of the second dentition.

III. Cicatrices of old ulcerations may be found in the nasal membrane, on the palate or about angles of the mouth.

IV. Somewhat enlarged lymphatic glands may be found in the neck. These are small, hard, and painless and never ulcerate. They are not to be mistaken for the large, soft and caseous glands of scrofula.

V. Exostoses and periostitis which are not painful may be found on the tibia and other long bones.

VI. Commonly the patients are deaf. This symptom becomes worse with each attack of interstitial keratitis.

II. The peculiar shape of the permanent central incisors of the upper jaw was first pointed out by Hutchinson³⁰⁻³¹ in 1858, and such teeth have since been known by his name. They are usually small, ill-developed, singly notched on their edges and are slanted.

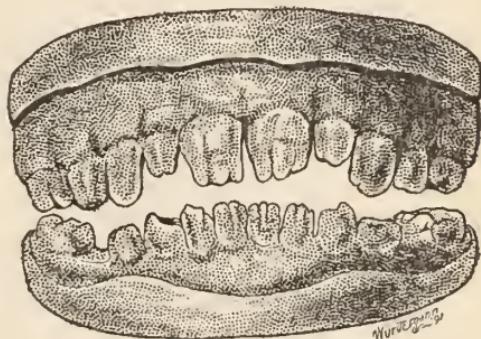


Fig. 11.—*Scrofulous Teeth.*

These symptoms can not all be obtained in every case but enough of them should be gotten together with the interstitial keratitis and a history of ancestral infection if possible before a diagnosis of specific keratitis should be given to the interested parties.

Loring³⁷ describes a case of acquired syphilitic parenchymatous keratitis occurring as a secondary symptom in a woman aged 20. Three months before, she had a secondary eruption on the legs, arms and neck. The patient complained only of failing vision in the left eye. There was no pain or any symptom beyond a clouding of the cornea. This seemed at first glance to be clear but on examination by oblique illumination it was seen to be full of minute, dirty yellow dots. The trouble continued without inflammation for over three months and only on catching cold was there any pain or pericorneal injection. The disease disappeared under anti-syphilitic treatment. Hutchinson³¹ mentions a case of most severe keratitis occurring as a secondary symptom, which resisted treatment for a long time but finally recovered.

Marlow⁴³ sent me two very interesting cases of acquired keratitis occurring as a tertiary symptom. A woman, aged 57, contracted syphilis in a rather round-about way as follows: Her daughter had a primary chancre of the lip in 1882, the infection having been without doubt obtained from a public drinking fountain. She was married some eight months later and in due course gave birth to a female child which developed at the age of six months symptoms of inherited syphilis. The grandmother had a large share of the care of the child and became infected with the specific virus and reported to a physician for treatment in July, 1886, who described her symptoms as secondary. The following year she developed tertiary symptoms and, in October of 1888, came to Dr. Marlow with a well pronounced interstitial keratitis at lower and central part of the right cornea. The haze was patchy, but there was no punctate keratitis. The left eye was amblyopic from an extensive retinal detachment which had existed for years. There were opacities in the vitreous. The cornea clouded all over and leashes of bloodvessels formed in its tissue. The disease passed away as a keratitis punctata. Two years later the patient developed symptoms of cerebral disease and died.

The other instance occurred in a man, aged 39, who gave a history of syphilis developing twenty years before, for which he had undergone constitutional treatment of about two years. For five years past the left pupil had been dilated and the right had been in a similar condition for two years. There was no action to light, but fair contraction with accommodation. He noticed that distant vision had failed after a vacation in which he had been on the water considerably. The examination showed in the right eye a diffuse haze and in the left a patchy opacity of the cornea. There was ciliary congestion in both eyes. Keratitis punctata developed in both cornea in the declining stage and finally disappeared.

I have recently had in my care a patient who presented the typical appearance of vascular keratitis. (See Fig. 8.) This was a girl of sixteen, whose rounded figure and rosy cheeks seemed to proclaim her the perfect picture of health. The father had led a rather loose life, and the mother had died in the

infancy of the child. She had one brother who was inclined to be sickly. The history of an eruption on the skin and of an inflammation of the left eye in her infancy was obtained. The right eye had an attack of the same trouble as at present about three years ago, and upon subsidence the left had become affected. Upon examination the left cornea was found typically clouded with patches of denser opacity and with leashes of blood-vessels running from the engorged pericorneal vessels to them. There were spots of superficial keratitis and the tension was lowered. Considerable lachrymation and photophobia was present. The physiognomy was not typical, still the forehead was prominent, the teeth were notched, there was a chronic naso-pharyngeal catarrh and the lymphatics in the neck were enlarged. The vision was reduced to perception of light and shade. In the course of ten days the cornea had sufficiently cleared under local and under specific treatment that the pupil could be seen. Later the iris was seen to be translucent in spots, and to be bound down to the anterior capsule of the lens, forming two small synechiæ. A few days later the patient could count fingers, and in two months the vision was nearly normal. The specific treatment proved the diagnosis, for when it was discontinued for a time the cornea rapidly clouded. The patient grew quite stout under the mercury. During the healing the opacity presented the appearance described as punctate keratitis. (See Fig. 12.)

I have notes of a case of the avascular form which I had the opportunity of following during nearly its entire course. A young quadroon came to the Washington Eye and Ear Infirmary with both corneaæ quite opaque. The parents said that the trouble had come on without inflammation some months before. The patient had nearly all the characteristic signs of a congenital syphilitic. The vision in both eyes was reduced to perception of light. The anterior epithelium was not involved, the opacity being deep seated. There was not even a suggestion of hyperæmia although when the eye was rubbed the circumcorneal vessels became engorged. The patient was given local and general treatment at intervals for over three years. One year afterward he could see to read and was going to school. Maculæ of the upper parts of the corneaæ remained for nearly two years more but finally disappeared. Cortical cataract, which was nonprogressive, was seen in either eye as soon as the corneaæ were clear enough for examination by the ophthalmoscope.

Of all the rare forms in which syphilis affects the eye or its appendages, disease of the orbital bones is probably least often met with, although the other facial bones are fre-

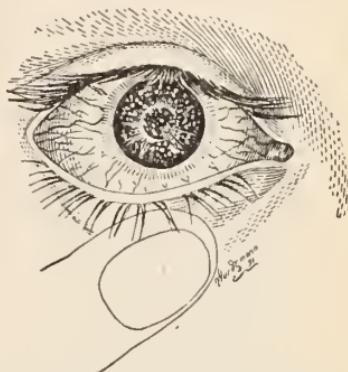


FIG. 12.—Punctate appearance in the healing stage of Interstitial Keratitis.

quently the seat of caries or necrosis. The walls of the orbit being in such intimate relation with the delicate organ of vision and with the brain, affections of its bones and of its contents are apt to prove highly dangerous not only to sight but to life itself. Periostitis does not often occur and exostoses, nodes, caries and necrosis are even more rare. The inflammations occurring in the orbital walls are usually complicated by cellulitis, which if not relieved may result in the formation of abscess, panophthalmitis or even death from brain complication. A chronic process may be set up and sinuses formed which discharge for a long time. The patient becomes rapidly reduced from the severe pain and general prostration. Chronic periostitis is most frequently syphilitic. [Bull.]¹⁰ Mracek,⁴⁸ concludes from the clinical study of six cases that these affections of the orbit are tertiary manifestations whenever they happen in the course of systemic disease. They are either productive, sclerotic or destructive. The first two forms have been mistaken for malignant growths. They produce strabismus, optic neuritis or exophthalmus which may be so great as to cause dislocation of the globe. The products of destructive processes may escape outwards or go through the sphenoidal fissure to the brain. The same event may occur from specific inflammation of the tendons and their fascia. [Bumstead.]¹¹

A woman at Moorfields had a large node growing from the inner wall of the orbit; it was perfectly solid to the touch, but pushed the eye outwards and forwards and had caused tension of the optic nerve so that there was loss of sight, a dilated immovable pupil and perfect immovability of the eye. She soon afterwards had severe cerebral symptoms and died suddenly in a comatose condition. [Poland.]⁵⁵

Noyes⁵⁴ mentions a case of orbital periostitis confined to anterior part of the orbit accompanied by intense pain. The symptoms first presented the type of a purulent conjunctivitis. There was an eruption on the face and exquisite tenderness of the orbital walls upon digital examination. The symptoms continued some two weeks when the other eye commenced to be inflamed and followed the same course. The patient recovered under local and specific treatment without injury to the eyes.

Evans¹⁸ reports bilateral orbital gummata occurring in a negro woman aged 29, who came to him on account of binocular exophthalmus, first noticed six months before. The left eye was most affected, its cornea dry and shrunken, the conjunctiva greatly chemosed and protruding between the lids until it hung down on the cheek. The right eye still had some vision although the pupil was dilated and the cornea hazy. The retinal vessels could be seen to be engorged. The left eye was pushed directly forwards and the right forwards and outwards. The ocular movements were impeded but no paralysis could be detected. Aside from being a bilateral affection, there was nothing characteristic about the exophthalmus, and no evidence of malignant or specific conditions. The accompanying cut [see Fig. 13], kindly lent me by Dr. Evans, shows tolerably well her condition, except in the right eye the size and shape of the conjunctival mass is not distinctly shown.



FIG. 13.



FIG. 14.

The case was thought at the time to be one of exophthalmic goitre as the thyroid was enlarged, although no cardiac symptoms were present. Three days later the left eye was enucleated. By digital examination of the orbit a movable tumor about the size and shape of a small almond was found occupying the space between the optic foramen and the inner canthus. No attempt was made to remove the growth with the exception of a small piece for microscopic examination which was reported to be "macroscopically of a yellowish-white color and very soft. Microscopically of a distinctly fibrillated matrix filled with round cells in the outer part, while the inner was made up largely of granular matter, with some fat, some shrunken cells, and poorly outlined bands of fibrous tissue." The case improved under large doses of iodide and a few months later the sight of the right eye was restored and the patient presented the appearance as in the illustration. [See Fig. 14.]

I have lately seen a case of metastatic abscess and cellulitis of the orbit in a patient who had chancroids followed by double ulcerating buboes of the groin. I can find no literature bearing upon the subject and the case is certainly unique. Syphilis could with certainty be excluded. The case resembles mycotic thrombosis occurring after gestation and was probably of the same nature. It is hardly possible that the eye affection was due to the virus.

The patient had been in the ward for some weeks. The glandular abscesses in the groin had been opened and antiseptically dressed by Dr. D. J. Hayes, the attending physician. The patient was much reduced and had a temperature of 101° for some days before I was called to attend the ocular affection. He was kept under morphine on account of the intense pain. The disease had commenced as iritis several days before and panophthalmitis soon set in. The temperature rose to 102°-105°, attended with rigors. A noticeable symptom was the rapid development of exophthalmus, which soon made the eye appear dislocated. Suspecting periostitis of the orbit, with pus formation, I made an incision down to the apex with negative findings.

Two days later I enucleated the eye and released a large quantity of pus from the capsule of Tenon. There was nothing wrong with the periosteum so far as could be learned from digital examination. The contents of the globe were disorganized, the lens opaque and the vitreous a fibrinous mass. The temperature fell to the normal a few hours after the operation, after which he made a rapid recovery and regained his general health. There were no symptoms of any general disease for a year afterwards. [See paper by author.]⁷³

Affections of the iris and uveal tract are common in the course of syphilis, but these as well as specific diseases of the other internal structures of the eye will not be considered in this paper.

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SOCIETY PROCEEDINGS.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Thursday, June 11, 1891. Henry Powers, M. B., President, in the Chair.

The Treatment of Squint by Advancement of the Recti Muscles.—Dr. Adolf Bronner (Bradford) read a paper based upon the records of fifty cases of strabismus treated by the advancement of one of the recti muscles, according to the method advocated by Schweigger. In most cases cocaine was the only anæsthetic employed. Dr. Bronner drew attention to the large number of cases of convergent strabismus, in which the external rectus was thin and atrophic. He thought it was of the greatest importance that the size and condition of the muscle should be ascertained as nearly as possible before the advancement was performed. In many cases tenotomy of the antagonistic muscle was necessary and in some tenotomy or advancement had to be performed upon the muscles of the fellow eye. In cases of divergent strabismus tenotomy of the external and advancement of the internal rectus were necessary, and the immediate effect of the operation should be slight convergence. In no case should the same muscle be tenotomised more than once. The author thought that advancement of the muscle was the best operation in all cases in which the squinting eye was amblyopic, and in which the angle of deviation measured more than 30° . The advantages of advancement of a muscle over an ordinary tenotomy were that the danger of a subsequent strabismus in the opposite direction was much less, and that the operation aimed at strengthening a weak muscle instead of weakening a muscle previously strong.

The President said that his experience of tenotomy had been satisfactory, and that he preferred the simpler operation in the majority of cases. He had seen but few undesirable results. The cases which he found most difficult to deal with were those of very slight squint with extremely troublesome diplopia.

Mr. Juler thought that Schweigger's plan of tying in two sutures would be likely to set up a good deal of irritation. He preferred an operation which was a modification of Critchett's, and with which he had had good results. He thought advancement of muscles in cases of strabismus was a method of treatment not fully appreciated by many English surgeons.

Mr. Eales (Birmingham) described the method of operating which he adopted; he frequently performed advancement of the recti muscles in strabismus cases.

Mr. Edgar Browne (Liverpool) after referring to the older methods of treatment employed in this country years ago, described the plan he himself adopted. He had found that the operation was simplified by introducing the threads in the reverse way to that usually done, that is, to attach the thread to the conjunctiva or sclera at the point of fixation first and subsequently to the tendon or muscle. He emphasized the importance of fully correcting any astigmatism in cases of strabismus.

Mr. Jessop had found that advancement of a rectus muscle without tenotomy of its opponent was of little value. He preferred to do the tenotomy by Landolt's method before bringing forward the weakened muscle.

Mr. Cowell said that in the operation described he recognized an old friend under a new name. The operation used to be known as readjustment. He had treated many cases of secondary divergent strabismus by this method, occasionally converging the eyes during the first day or two after the operation by a suture passed through the skin at the bridge of the nose.

Mr. Lang pointed out that the terms readjusted and advancement of a muscle had different meanings. He thought

it important in this treatment to endeavor to restore binocular vision at the time of the operation.

Mr. Doyne (Oxford) and Mr. Story (Dublin) thought that binocular vision after operations for strabismus was an exceptional result and one which few operators seriously sought to obtain.

Dr. Bronner, in reply, affirmed that Schweigger's method of operating maintained the normal lateral movement of the globe. He had long given up thinking about the restoration of binocular vision in cases of strabismus.

Detachment of the Choroid.—Mr. Story (Dublin) read notes of a case of this rare affection in a man, æt. 29, who had been for more than two years under his care. The patient was kicked by a horse on his right eyebrow and nose in childhood, and some years later was struck by a stone at the outer angle of the left orbit. These injuries seem to have no connection with the loss of sight, which occurred rather gradually in his right eye at the age of 20, and in his left about a year before coming to the hospital. During the two years he has been under observation no important changes have occurred in the state of the eye; slight variations have taken place in the extent of the detachment, and vision has remained pretty constant at fingers at 2 meters in the right and fingers at 4 metres in the left eye. Tension normal, or at times slightly subnormal; media clear except for a nebula on the left cornea, and opacities in both vitreous chambers; discs slightly hazy, and marked perivascular thickenings about all vessels. In the right eye there are two hemispherical detachments of the retina alone, one at the macula lutea about three times the diameter of the papilla, and a large one at the inferior nasal part of the fundus, extending to the extreme periphery. Except at these two places, the choridal stroma is everywhere as distinctly visible as the retinal blood vessels, and everywhere requires exactly the same glass to observe it by erect ophthalmoscopic examination. The refraction of different portions of the fundus is as follows in the right eye. Disc centre — 1, edge + 1. Retinal detachment at macula with irregularity of lamina limitans in-

terna + 8. Choroid and retina at temporal end of horizontal meridian + 12 (a slight retinal detachment more peripherally + 13)- At nasal end + 12, and large retinal detachment more peripherally + 18. Retina and choroid at both ends of vertical meridian + 8. Left eye disc + 0.5. Macula + 1.5. Retina and choroid at nasal end of horizontal meridian + 8, and on another occasion + 12, at temporal end + 12. At upper end of vertical meridian + 7 and again + 4, at lower end + 5, Mr. Story referred to the cases of detachment of the choroid already published, and showed in what a remarkable manner the present case differed from all those which have been previously observed.

Temporal Hemianopsia of Left Eye and Absolute Blindness of Right.—Mr. Story (Dublin) gave a further history of a case (not yet published) which he had brought before the Society in 1887. A girl, æt. 19, came to him in 1885 with the right eye absolutely blind, and with complete hemianopsia of the left, the line of demarcation passing through the fixation point. The other symptoms were violent pains in the head, giddiness, vomiting, amenorrhœa, and tendency to corpulence. Since then these distressing symptoms have mostly subsided, but her field of vision remains unaltered, and central vision has considerably deteriorated. Vision which was in 1885 =⁵/_{xx} is now only =⁵/_{xx} (?) Careful examination has completely failed to demonstrate the hemianopic pupillary reflex. Mr. Story suggested that the case might be one of a tuberculous growth in the region of the chiasma, which had now for some years ceased to increase. Charts of the field of vision, taken at various times during the last six years, were exhibited.

Card Specimens.—Mr. Tatham Thompson (Cardiff); Emphysema of Conjunctiva. Mr. Stephenson: Two Cases of Peculiar Retinal Pigmentation. Mr. Treacher Collins: Epithelial Implantation Cyst.—Mr. Cowell: Congenital Fissure of Upper Eyelid. Mr. Doyne (Oxford): Coloboma of Iris and Choroid, with bulging of corresponding portion of circumference of the Lens.

FRIDAY, JULY 3, 1891.

Perchloride of Mercury in the Curative Treatment of Trachoma and other Conjunctival Diseases.—This paper (by Mr. Kenneth Scott, Cairo) was read by the Medical Secretary. Mr. Scott had had a large experience of trachoma in Egypt, and after trial of several methods of treatment, had decided in favor of perchloride of mercury. He used a 4% solution made by dissolving the salt in glycerine, and then diluting with water. This he applied to the everted lids once a day, and in addition gave the patient a $1\frac{1}{4}\%$ solution to be used thrice daily. Iron tonics were usually prescribed during the treatment. Most of the cases were treated as hospital out-patients; a few were admitted to the wards. Mr. Scott's results with this treatment had been very satisfactory, nearly all cases being cured in about eight weeks. A similar treatment had proved very efficacious in ophthalmia neonatorum, the administration of iron being omitted in these cases.

Mr. Mackinlay referred to the fact that the use of perchloride was by no means new. The older writers nearly all recommended it, but the strength of the solution used had varied at different periods.

Mr. Juler was inclined to think Mr. Scott's records were too good to be true. He had used perchloride of mercury in the solid pencil combined with nitrate of potash, with satisfactory results, but his cases were not cured so rapidly as Mr. Scott's.

Mr. S. A. Stephenson said he had an extensive experience of trachoma, and had employed perchloride of mercury in 1% solution. Although a valuable remedy, he did not think it could be considered a specific. He had invented the pencils referred to, their composition being 1 of perchloride and 4 of nitrate of potash.

Mr. Silcock expressed his satisfaction with the perchloride in trachoma, but did not regard it in any sense as a specific for the malady. •

On a Peculiar Form of Retinal Pigmentation.—Mr. Sydney Stephenson read a paper on a peculiar variety of pigmentation

of the retina, of which he had observed three cases during the examination of 2,500 eyes. The characteristic ophthalmoscopic appearances consisted of variously-shaped groups, composed of dark-colored spots, arranged over a sector-like portion of the fundus. In each patient (all of whom were males) one eye alone was affected; the sight was normal, and the visual fields not contracted; night blindness was not present. Moreover, though the cases were under observation for a lengthened period, the pigmentary groups remain stationary. A similar condition, Mr. Stephenson stated, is described in Jaeger's *Hand Atlas*, Jaeger regarding the change as an anomalous form of retinitis pigmentosa. Mr. Stephenson, however, relying on the unimpaired visual fields and the non-progressive nature of the the deposits, believed that the condition was physiological. He was inclined to think that the pigmentary changes described are allied to those small aggregations of retinal pigment which may be found in 8% of healthy eyes, and, in explanation of both these conditions, suggested that the development of pigment cells in the proximal plate of the optic cup had overstepped its usual limits, and in this way produced the changes in question.

Mr. Jessop asked the position of the pigmentation. From the drawings shown he thought the changes were chiefly in the region of the choroidal cleft.

Dr. Anderson referred to cases of his own mentioned by Dr. Stephenson; and showed a drawing of the right fundus oculi of a boy, æt. 15, suffering from rheumatic endocarditis, which exhibited groups of pigment deposits, each deposit being angular in shape. The left eye of the same patient contained a large mass of homogeneous black pigment on the nasal side of the optic disc. He had come to the conclusion that the changes were congenital and physiological.

Mr. Frost said that the physiological or pathological nature of the pigmentary changes could be determined only by noting whether they were progressive or stationary.

Mr. Nettleship thought that the normal appearance of the choroidal pigment epithelium in Mr. Stephenson's cases was

good evidence of the physiological nature of the pigmentation. He was not cognizant of any retinal or choroidal pigmentation of pathological origin in which the hexagonal pigment layer remained unchanged.

On the Consensual Pupillary Light Reflex in Cases Exhibiting the Argyll-Robertson Pupil Symptom in one Eye.—Mr. Jessop read notes of five such cases (three occurring in Dr. Ormerod's practice); three were cases of tabes, one doubtful tabes, and one probably sclerosis of posterior and lateral columns. In all, though the contraction of the pupil associated with accommodation was present in both eyes, the direct and consensual light reflex was lost in one and the same eye. In all the cases, also, the consensual light reflex was present in the sound eye, thus showing that the optic nerve of the affected eye was capable of carrying impulses to the light reflex center of the opposite eye. The lesion in these cases is probably one affecting the light reflex center for one eye near the endings of the afferent part of the reflex arc. These cases strengthen and uphold the theory of the decussation of the optico-pupillary fibers.

Two Cases of Complete Blindness, with good Pupillary Light Reflexes.—Mr. Jessop related two cases. The first was a boy, æt. 16, with history of two and a half years' blindness, suffering apparently from "cerebral tumor." Both optic discs were white and atrophied, with small arteries. The pupils were very active to light, both direct and consensual, and also acted to accommodation and convergence. The second case was a man, æt. 34, who had been blind for six months, with loss of knee-jerks. The optic discs were atrophied, with small retinal arteries; the direct and consensual light reflex was present, and the pupils contracted with convergence and accommodation.

Nystagmus in a Compositor.—Mr. Snell (Sheffield) brought forward this case. The patient, æt. 21, had just completed his apprenticeship, and was engaged on the staff of a large daily paper. He came under observation on October 17, 1890. His work for some months had been heavier than usual, the hours from 7 P. M. to 3 A. M. Two days before coming to Mr. Snell

he returned home from work, went to bed, and rose as usual at 12 (noon). Then he noticed objects moving up and down, with some giddiness, but no pain in the head nor sickness. The nystagmus was found to be vertical, and the movements were rather jumping; there was quivering of eyelids. He was carefully examined for any central or other lesion, with negative results. The absence of any assignable cause and the resemblance in some particulars to miners' nystagmus suggested inquiry as to the way his work was performed. He was visited at the printing office, which was of course well lighted, and it was found that when he looked up to his "copy" instead of raising head and eyes together, he elevated the eyes only. This was fully described. Anyone trying it will find out how trying it is. Other men at work raised the head with the eyes. The patient gradually recovered, the oscillations disappeared, and he returned to work on December 30. He now works with comfort, having adopted the suggestion as to raising his head at the same time that he looks up from the type to the "copy." Quite recently he has developed "compositors' cramp" in the right hand, and is incapacitated thereby from doing his work. Mr. Snell alluded to his views as to miners' nystagmus having for its prime cause the constrained position in which coal-getters worked. He mentioned instances occurring in men (not practical colliers) working at the pit bottom in good light, whose gaze was constantly turned up as the cage ascended and descended. Nystagmus, Mr. Snell thought, would probably be found associated with other occupations occasionally. Writers' cramp has been followed by the recognition of many similar conditions. The mention of this compositor's case would perhaps lead others to recognize more clearly the connection of nystagmus with occupation.

Immediate Loss of Sight of Both Eyes after Injury to Head.—Mr. Snell (Sheffield) related this case. The patient, æt. 19, was on December 12, 1890, crushed under a cage in a coal pit; the cage weighed five or six tons; it struck his head and then pressed him down, laying him out almost flat. He lost consciousness, and bled at the nose and ears; his face and eye-

lids were swollen, and when he could open the eyes the conjunctivæ were deeply ecchymosed. On recovering consciousness he found that he was perfectly blind, and he has remained so since. When seen first by Mr. Snell on March 24, the optic discs were decidedly whitened; but Mr. Jones, of Wath-on-Dearne, who had examined the patient with the ophthalmoscope between two and three weeks after the accident, was unable at that time to detect any definite change in the color of the discs. Mr. Snell said the interest of this case lay especially in the loss of vision in both eyes. He alluded to Holder's important data as to the frequent implication of the vault of the orbit and optic canals in fractures of the base of the skull. In this case the fracture would be far forwards, and involved the optic canals or body of sphenoid; it would also damage the optic nerve or chiasma. The slow appearance of optic atrophy was mentioned as in accordance with experience when the injury to the optic nerve was behind the entrance of the central artery.

Albinism: A Curious Family History.—Dr. G. W. Sym (Edinburgh) sent notes of a family of seven children who were alternately albino and dark. The children, with the exception of the seventh, were all living, and in good health. They had no mental defects. The parents and all other relatives had dark complexions.

Living and Card Specimens.—Mr. Silcock: Epithelioma of Upper Eyelid, Cheek, and Lip.

Mr. Cowell: Case of Acromegaly with Atrophy and Optic Nerves.

Mr. Critchett: Knife for Division of Membrane in Pupil after Cataract Extraction.

Mr. Treacher Collins: Intraocular Growth in a Blind Glaucomatous Eye.

Annual Meeting.—The annual general meeting was held at 9:30 p. m., and the following officers were elected for the ensuing year:

President.—Henry Power.

Vice-Presidents.—James Bankart (Exeter); John Whitaker

Hulke, F.R.S.; John Hughlings Jackson, M.D., LL.D., F.R.S.; William M. Ord, M.D.; D. C. Lloyd Owen (Birmingham); H. R. Swanzy (Dublin); John Tweedy.

Treasurer.—George Cowell.

Secretaries.—Charles E. Beevor, M.D.; A. Quarry Silcock.

Librarian.—W. Adams Frost.

Other Members of Council.—James Anderson, M.D.; G. A. Berry, M.D. (Edinburgh); E. Treacher Collins; F. Richardson Cross (Bristol); Henry Eales (Birmingham); Robert Marcus Gunn; Gustavus Hartric \ddot{e} ge; Frank H. Hodges (Leicester); W. H. H. Jessop; Herbert William Page; J. A. Ormerod, M.D.; D. D. Redmond (Dublin).

CORRESPONDENCE.

HOMATROPINE.

MACON, GA., Sept. 1861.

EDITOR AMERICAN JOURNAL OF OPHTHALMOLOGY.—I am always interested in the writings of that veteran Ophthalmologist, Dr. J. J. Chisolm, and while I have known for some time of the views which he holds in regard to the efficacy of homatropine in refractive work, I have been patiently waiting for him to announce his change of conviction in this respect; but in his article in your July and August number he reiterates, if possible, more strongly than ever, his opinion that homatropine is all-sufficient, and that the oculist who subjects his patient to atropine is really culpable.

Now I hope Dr. Chisolm will pardon the apparent temerity of a "youngster" like myself, whose experience in ophthalmology dates back about 11 years, but I wish to put myself on record as having to disagree with him as to the efficacy of homatropine in refractive work. The work I have done in this line, I think, I have done with care, and if there is any one fact in refractive work of which I have become fully convinced, it is that homatropine will very frequently fail to fully relax the accommodation.

I have tried it sufficiently, in strengths ranging from 5 to 20 grains to the ounce of water, and many are the times in which the subsequent use of a 4 grain solution of atropine showed that the homatropia had revealed often only as much as $\frac{1}{3}$ of the real error, and had marked astigmatism very frequently. Now, if Dr. Chisolm means that he can get along satisfactorily in his refractive work, provided he knows only a part of the

error which his patient possesses, then I have nothing to say. I feel it necessary for me to know what the whole error is. I have given homatropia a sufficient trial, and I sincerely regret having had to give it up. Having to give it up has lost me many a valuable client, who went elsewhere to doctor so and so "who fitted his friend's eyes for glasses and put some drops in them which only blinded him for one day, whereas my drops would blind him for a week." And yet I dont know that this has been any more unpleasant than has been the knowledge that homatropia has caused me to do much of my refractive work wrong. It has often proved exceedingly unpleasant to find that the glasses which I had prescribed for a patient had turned out to be unsatisfactory. It is a very unpleasant thing to undertake to explain to a patient that his accommadation would not yield to homatropine though his neighbor's might, and that he must have a second pair of glasses made. I say point blank: homatropia has so frequently failed to relax the accommadation among my patients that I have (very regrettfully) given up the use of it. I sincerely wish we could get some reliable mydriatic other than atropine, for besides the loss of time, etc., entailed upon our patient, I do not ignore the dangers possible in cases where there is tendency towards glaucoma, to say nothing of the very unpleasant toxic symptoms which I sometimes produce with a 4 grain solution.

Dr. Chisolm and myself are both honest men, and I should like to have the views of some of the "wise men from the east," and also the west, as to why and how it is that our opinions are so different in regard to this very important matter.

R. O. COTTER, M.D.

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VOL. VIII.

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No. 10.

ORIGINAL ARTICLES.

GLAUCOMA AFTER EXTRACTION OF
CATARACT.

BY F. BULLER, M.D., OF MONTREAL, CANADA.

Read before the Ophthalmological Section of the Congress of American Physicians and Surgeons in Washington, D. C., September, 1891.

The precise conditions which lead to glaucoma after the successful removal of cataract are not yet so well established or understood as to render a further study of these cases unnecessary. The three cases I propose bringing before you present some features I think which are worthy of consideration, and in the matter of treatment I must confess myself still in doubt as to the proper course to be pursued. It is in this direction especially that I shall be glad to hear the views of other ophthalmic surgeons who may have had a wider experience than has fallen to my lot. I shall, without further comment, proceed to give the salient features of these cases.

CASE I. J. M., a rugged Scotchman, æt. 73; left eye uncomplicated, mature cataract, removed early in September, 1883. Ether used as an anæsthetic. The extraction was with iridec-

tomy and peripheral capsulotomy, perfectly smooth, puncture and counter-puncture being about 1 mm. behind clear cornea. In healing the inner angle of wound contained just a small portion of entangled iris, not a prolapse, but just enough to show as a small dark spot beneath the conjunctiva. A slight iritis appeared at the end of first week, but no adhesions resulted. Sixty days after extraction the eye was quiet, and $V.=^{20}/_L$ with $+4^{1/2}$, sph., capsule rather dense. Discussion done with two needles; moderate reaction, irregular central aperture obtained not quite as large as desired. On April 14, following, a note was made of vision, etc.: $4^{1/2}/\text{C}+28$ cyl. ax. 90° . $V.=^{20}/_{\text{XXX}}$ and $+3$ sph. $\text{C}+28$ cyl. ax. 90° ; reads J.I. at $10''$ fluently. The condition of the eye appeared entirely satisfactory. For several years the eye was used freely, especially in reading, the patient being rather a book-worm. His habits of life were regular and temperate, except that he is unduly addicted to snuff-taking.

About the beginning of the year 1888 he found the vision of the left eye deteriorating. Shortly afterward I examined the eye, and discovered rather deep cupping and an atrophic appearance of the optic nerve, just as in ordinary chronic glaucoma. Tension was decidedly increased, there was the usual limitation of the visual field, and vision reduced to $^{20}/_{\text{LXX}}$. In March, 1888, vision was still further reduced to $^{20}/_{\text{CC}}$. I then made a free sclerotomy downward, without benefit. In January, 1889, vision was reduced to qualitative perception of light, and the eye had now a distinctly glaucomatous appearance, with symptoms of considerable irritation and still greater tension. The cornea was cloudy; iris and capsule pushed forward, and the lower lid in a condition of entropium.

The right eye was now blind from complete cataract, but otherwise healthy. On January 25, I removed the cataract from the right, under cocaine. Recovery from the operation was perfectly normal, and the eye is as good to-day as could be desired. The capsule is not opaque and scarcely interferes with vision. The patient, now 81, somewhat ostentatiously declares he can see as well as ever he could in his life. The

left eye has ceased to trouble him, although the lower lid still turns in, and the eye has the typical appearance of glaucoma consummatum. There is practically no anterior chamber, the iris and capsule dimly seen through the cloudy cornea are pushed forward to its posterior surface.

In addition to a general cloudiness of the cornea there are many circumscribed, dense interstitial and vascularized opacities. Inversion of the lid and consequent mechanical irritation of the cornea will doubtless account to some extent for the unusual development of blood vessels in its substance. Another peculiarity is in the scar of the original wound, which now appears as a dense vascularized yellowish white streak, about .5 mm. in width across the upper part of the cornea. That the entropium had nothing to do with the development of the glaucoma is obvious, since the lid only became inverted when the eye was already practically blind.

As far as I could ascertain, there were three factors likely to have been instrumental in lighting up the glaucomatous process. They were, first, the small portion of entangled iris at the inner end of the wound; second, the patient's bookish propensity; third, the thick capsule which, after discussion, formed a dense band above, which, to all appearance, lay along that portion of the canal of Schlemm which corresponds to the coloboma. With the band of capsule in this position and the entangled iris, as described, in all probability excessive use of the eye in reading created sufficient irritation to obstruct the circulation of fluids in a considerable extent of Schlemm's canal, thus initiating the glaucomatous process. Should I again meet with a similar chain of circumstances, I would feel inclined to perform the sclerotomy upward with the hope of establishing a filtration scar through the line of obstruction.

CASE II. October 12, 1887. A. D., æt. 73, Scotch by birth. Is a tall, robust looking man for his age, and in good general health. Has been failing in vision for some months, and there is a natural uncomplicated cataract in right eye. Left eye, cataract immature, fundus seen fairly well, appears normal,

except that the optic nerve is somewhat pale; $V.=^6/_{LX}$. Extraction with iridectomy and peripheral capsulotomy done under cocaine, 4% solution; by an error cocaine was used three or four times several hours before the operation; only one drop was instilled five minutes prior to the operation. When the cataract was removed, the cornea and eye generally was very flaccid, causing some difficulty about removing the lens completely; on account of this difficulty some lens substance was allowed to remain in the eye. Healing progressed favorably until the fourth day, when he managed to strike the covering of the eye with the hand and open the wound; a moderate reaction followed this injury.

Seventeen days after the operation the eye was quiet, and with $+12$ D. $V.=^6/_{LX}$, being greatly obstructed by a thick and wrinkled capsule containing some cortical substance. Capsulotomy done with one needle. Six days later all reaction had subsided, but there was only a small opening in the capsule, and very little improvement of vision. By the middle of December, that is six weeks after dissection with $20^{\circ}+2.00+11.00$ $V.=^6/_{XII}$. For about one year he continued to enjoy pretty good vision, but in May, 1889, this was reduced to $^6/_{XXX}$ by a diminution of the capsular aperture. May 6, 1889, capsulotomy was again performed, this time with two needles, resulting in a good sized and nearly central aperture. This was followed by a sharp reaction for a few days. On June 11, 1889, vision was again $^6/_{XII}$ with his compound glasses. A few months later he noticed a gradual diminution in the acuteness of vision, and on October 30, $^6/_{XVIII}$ was the best he could do. At this time I could discover no positive cause for the failing vision; certainly it was not due to any fault in the capsular operation, the fundus was distinctly visible in detail, and showed no coarse changes, only a doubtful increase of tension was noticed, without cupping of the nerve or limitation of the visual field; the latter, however, was not then tested with as much care as the doubtful tension demanded.

There is nothing in the appearance of the eye suggestive of glaucoma. No iris in the wound and no adhesion of iris to

the dense capsule; under the edges of the pupil the capsule was thick and white, no doubt the result of an antecedent capsulitis, together with unabsorbed cortical remnants. For fifteen months longer, he continued to follow his employment (store house inspector, in a large railway company) without much difficulty, but on January 26, of this year, or three years and three months after the original operation, he came, on account of a recent and rather rapid failure of vision, which was now reduced to fingers at 6'. There has been no pain "only a blur or smoke has come over the sight." The sclerotic presents a slight glaucomotous injection. The cornea is faintly clouded. T. 2 and field contracted, on nasal side nearly to the center. Has not seen halos. The most, in fact, the only conspicuous abnormality about the eye is the condition of the capsule, which in addition to the thickened appearance, already mentioned, now bulges forward as a sail-like prominence in its upper part. The central aperture is clear and well defined as ever and the vitreous is free from opacity, so that a perfect view of the optic nerve is easily obtained. The nerve is pale and presents a moderately deep shelving cup, arterial pulsation is doubtful. The choroid is normal. On the same day I performed a large sclerotomy in a downward direction. No benefit came of the operation. Vision steadily diminished and on March 3 there remained only qual. p. l.

March 6, 1891. The left eye now presents a mature uncomplicated cataract, which I extracted with iridectomy, using Knapp's capsule forceps instead of the cystotome for opening the capsule. The wound united kindly and every-thing was entirely satisfactory until the fourth day; he then managed to strike this eye also through the bandage and re-open the wound. This remained open three or four days, but healed perfectly at last, without entangled iris or other visible complication. Three weeks after operation vision was tested, and with $180^{\circ} + 3.00 + 9.00$ $V = ^6/xx$; a delicate looking shining capsule is stretched across the pupil, but without adhesion of the iris to any part of it.

At the end of four weeks he was out and at work, as usual,

although advised that the eye was not in a fit condition to be used. It looked and felt perfectly well. Before the end of April he was reading the evening papers at night, but outraged nature brought swift retribution. On May 2, he came with the statement that 4 days previously the sight suddenly became dim and the eye very painful. Fingers at 8 feet was all he could contrive to see. There was in addition T+2, steamy cornea and sluggish pupil, capsule thicker than when last seen, somewhat pushed forward and beset with minute dots, which appear dark when seen through a +20. D lens. Fundus seen very dimly, no details, no floating opacities in vitreous.

One drop of a 0.5% solution of eserine was now instilled and ordered to be repeated three times daily. Patient to remain quiet in a dim light. On the following day V= $^6/_{xxvii}$. The first drop took the pain away. To continue this treatment. May 9, V= $^6/_{xx}$ with correcting glass.

June 2. He has used eserine once or twice daily until yesterday. Can read and write with facility and has resumed work. Eye still a little hard, but there are no other signs of glaucoma. With 180° + 1.25 + 12.00 $^6/_{18}$.

Advised to continue the eserine once every other day.

Sept. 20, 1891. Has had no further trouble with the left eye since June. The eye looks and feels perfectly well, tension is normal and in ordinary daylight V. Field is complete. He has used one drop of the eserine solution every other day and has worked comfortably all summer.

The capsule is thin and mostly clear; it is stretched straight across and not bulged and with a +20 D. lens, presents a series of bright folds pleated up to an irregular bright band at the upper part. The pupil is active and nowhere adherent. The optic nerve though pale is not cupped. The pallor of the nerve is of no special significance since it was observed several years previously, before the cataract had obscured the fundus. The right eye continues unaltered, blind but harmless. Tension remains distinctly increased.

In both patients the age, nationality and physique was similar. In cases 1 and 2 a long interval of useful vision occurred

between the operation of extraction and the glaucomatous trouble. In both a dense capsule had been divided and the upper portion evidently rested in contact with the corresponding filtration region. This clinical observation, recorded in my note book, some years ago, has since been sustained by pathological investigation, as has been gathered from Mr. Collins' valuable paper, read before the Ophthalmological Society of Great Britain, in 1890, in which he describes that condition as an almost constant pathological state in eyes that have perished from glaucoma after extraction of a cataract. In none of my cases were there adhesions between the capsule and iris.

In all three, excessive use of the eyes seems to have been the important factor in the development of glaucoma. It is somewhat remarkable that both eyes of one patient became glaucomatous although not the slightest tendency to glaucoma existed prior to the removal of the cataract.

In the last case eserine has evidently had a curative effect, but in this case the glaucoma was more acute and in all probability depended on an early and injudicious use of the eye. The mechanical features of this case are totally different from the other two, and I am inclined to look upon the outbreak of glaucoma in this instance as an irritative condition brought on by over-exertion of the eye before its filtration apparatus had recovered from the disturbance which a wound in the immediate vicinity, but not to any extent through the canal of Schlemm, might readily create. The operation was, so far as I can judge, a typically perfect one, nor is there the least trace of injury or ill effect from the wound having been reopened a few days after its first closure. The capsule is, I think, certainly not in contact with the extraction scar, but then it is to be observed the eye has recovered without operation, showing that the cause of the glaucoma, whatever it may have been, was of a transient nature.

THE PRISMOMETRIC SCALE.

WITH ELEVEN ORIGINAL DIAGRAMS.

BY CHARLES F. PRENTICE, NEW YORK.

During the past two years "The Metric System of Numbering and Measuring Prisms"¹ has been a subject of considerable discussion, although the exact nature of its unit, the prism-dioptry, does not seem to have been generally understood, while its practical advantages to opticians, "of whom accurate work is expected," have been wholly disregarded in some recent criticisms, in which it has been compared with Dr. Jackson's and Dr. Dennet's equally as scientific though less convenient systems. It is, therefore, now proposed to call attention to a still more simple feature of the metric system, with further explanations, yet with the understanding that the reader is familiar with its general principle and applications as originally explained.

The prismometric scale, preferably drawn upon heavy paper or card board, consists of a line of gradations, "6 centimeters apart,"² which are indicated by heavy vertical lines, with an in-

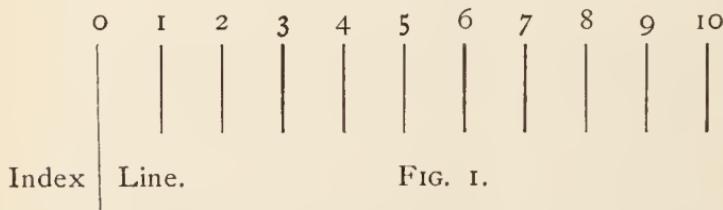


FIG. I.

dex-line at zero, longer than the rest, as shown in Fig. I, which

¹A Metric System of Numbering and Measuring Prisms. By Chas. F. Prentice. Archives of Ophthalmology, Vol. xix, Nos. 1 and 2, 1890, and Vol. xx, No. 1, 1891.

²See Archives of Ophthalmology Vol. xix, No. 2, 1890.

being just six times greater than the "coarse centimeter scale" referred to in my first paper, is intended to be placed at a six times greater distance, or "6 meters" from the eye; when simple prisms may be measured by it according to the manner originally set forth.

The *average* deflections produced by our commercial prisms, marked 1° to 5° , will be found to correspond closely to this scale up to the fifth division.

In applying the scale to the measurement of sphero-prismatic lenses, it is evident that the index-line will be rendered more or less indistinct in viewing it through such a lens, so that the lenticular element of the sphero-prismatic lens will require to be fully neutralized by a *contra-generic* lens of the same power, when, by shifting the neutralizing lens from right to left, it will be possible to secure a position for it which will leave us the prismatic deflection which it is sought to attain by the inherent prism of the entire combination.

The procedure is best explained by the following example: The optician being requested to grind a sphero-prismatic lens of $+3$ D. sph. $\odot 2$ prism-dioptries, selects from his stock a prism which is *rough* on one side, and which he consequently is obliged from its *marking*, to take for granted is a prism of 2° . He then grinds the rough side to $+3$ D. spherical, when, according to the old method, he naturally assumes that he has accomplished the full object of his purpose. It is now suggested that he carefully determine the optical center of a *concave* lens of 3 dioptries, and mark this point with an ink dot, placing the opposite side of this neutralizing lens in contact with the spherical side of the sphero-prismatic lens which it is desired to measure. He is next requested to hold the entire combination before his eye, at exactly 6 metres from the scale, the precaution being taken to have the base-apex line of the sphero-prismatic lens horizontal, with the base to the left, and in such a manner that the upper edge of the entire combination covers only the lower half of the pupil. The index-line observed through the lenses will then appear to be displaced toward the right, relatively to the graduations as

seen through the uncovered upper portion of the pupil. In the event of the index-line appearing to be displaced more or less than the required graduation marked "2," the operator has only to shift the neutralizing lens carefully to the left or right, until the index line exactly cuts the second graduation. Care should be exercised not to change the position of the spheroprismatic lens during this act, and while in this position, an ink dot should be placed on the spheroprismatic lens, precisely opposite to the dot on the neutralizing lens. The former then indicates the point which should form the center of the glass in the spectacle frame.

The reasons for this will be obvious from a consideration of the following figures :

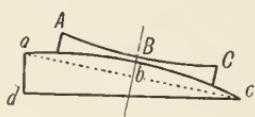


FIG. 2.

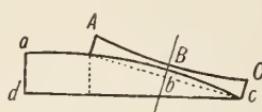


FIG. 3.

The concave lens A B C in Fig. 2, with its center at B, neutralizes the convex lens a b c, thus securing the *effect* of a prism a c d, *just at the opposite points* B b. By shifting the neutralizing lens, as shown in Fig. 3, the effect of a prism of greater angle is obtained. It is, consequently, possible, within reasonable limits, by this means to correct any inaccuracy which may have existed in the original *rough* prism. The same effect is obtained in spherocylindro-prismatic lenses, by neutralizing the cylindrical element with an additional and carefully adjusted *contra-generic* cylindrical lens, though this is naturally a little more difficult.

I shall preface a further discussion of this question with a few simple optical definitions, which I hold to be indispensable to a thorough understanding of the subject, and which, much to my regret, and for reasons too obvious to mention, were not presented by me in my previous papers in the *Archives of Ophthalmology*.

1. The optical center of a lens is a point situated upon a line called the *optical axis*, which must be perpendicular to both the anterior and posterior surfaces of the lens.

2. DIRECT PENCILS.—Rays of light which are emitted from a luminous point upon the optical axis will be refracted and directed to a conjugate point upon the same axis, it being specifically noted that the axes of the incident and refracted pencils of light and the optical axis of the lens *must coincide*.

3. OBLIQUE PENCILS.—In any case where the axis of the incident cone of light does not coincide with the normals to the surfaces of the refracting medium, whether it be a lens, prism or plate, the refracted pencil will no longer be a circular cone of light; but it will be a pencil bounded by a surface penetrating the medium and defining its illuminated area, besides intersecting two focal lines, which are at right angles to each other and the axis of the refracted pencil.



FIG. 4.

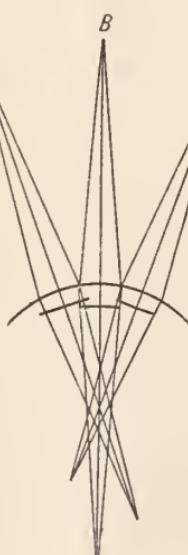


FIG. 5.

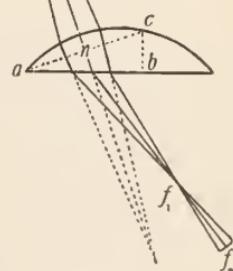


FIG. 6.

The same laws apply to the *reflection* by spherical surfaces of direct and oblique incident pencils of light, and their mathe-

matical elucidation is given by Profs. R. S. Heath and W. Steadman Aldis, in their recent exhaustive treatises on Geometrical Optics.

In illustration of the above definitions, let the curved line in fig. 4 represent the spherical surface of a medium with a greater density than air, when perpendicularly incident conical pencils of light, projected upon it from successive points A, B, C, will have their respective conjugate foci, f, upon the correlative radii with which the axes of the incident pencils coincide. If the refracted pencils, *within* the medium, are to have *focal points outside* of the medium, the axes of these pencils will have to be *perpendicularly* intercepted by the second surfaces as shown by the heavy lines in fig. 5; and in the event of the second surface occupying an oblique position, a b, fig. 6, with respect to the pencil A, the medium must be considered as a lens, having its optical centre upon the axis An of the incident pencil, with the prism a b c added to it.

The circular cone of light, *within* the medium, will then project an elliptical area of illumination, E, fig. 7, upon the second surface, as the axis of the pencil is here *oblique*, and the refracted pencil ceases to be a circular cone, projecting itself outside of the medium as an *astigmatic* pencil, of which f_1 and f_2 are the focal lines at right angles to the axis, the whole being deflected toward the base of the inherent prism P.

While this optical phenomenon, which in this case we may term a sphero-cylindro-prismatic action, may be new to many, it has been known to physical science since Kummer, in 1860, first called attention to the theory by which it was mathematically demonstrated. Its significance to ophthalmological science may, perhaps, be treated of in the future.

The fact, however, may be experimentally, though roughly, demonstrated by placing a plano-convex lens of 8 dioptries directly between a light at 10 or even 20 feet, and a screen receiving its image. On interposing a prism of 20° , for example, with its base down, and in a manner to insure contact of the plane faces of the glasses, the image will be observed to change both its form and position upon the screen. By draw-

ing the screen slightly nearer to the lens, a horizontal though imperfectly defined line corresponding to f_1 will become manifest, and by increasing the distance between lens and screen a vertically elongated looped figure, closely resembling a line at f_2 , will appear.

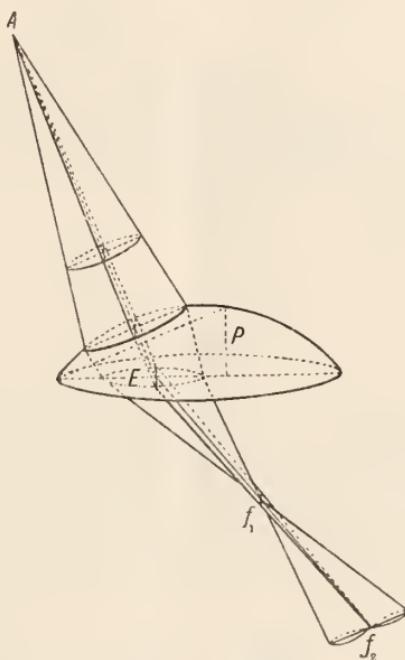


FIG. 7.

When a circular cone of light, C, fig. 8, from a short finite distance falls *obliquely* upon the face of a simple prism, we again have an elliptical area of illumination, and the refracted rays *within* the medium will assume a direction as if emitted from the focal lines v_1 , v_2 , reaching the second surface of the prism, and being refracted by it to the eye at E, as if projected from the lines V_1 , V_2 , on the opposite side of the prism.

There is one exception to this result, and that is when the axis of the incident pencil assumes a direction which is subject to minimum deviation, in which event the emergent pencil will appear to diverge from a *point*, at the same distance

from the anterior surface as the original source of light C. In the case of a plate, the emergent pencil will also be of astigmatic form, with the difference that it will appear to proceed from a pair of focal lines located upon an axis *parallel* to the axis of the incident pencil.

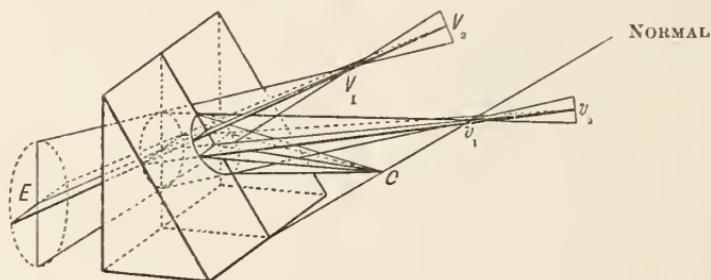


FIG. 8.

This spherocylindro-prismatic action, on the part of a simple prism may be experimentally demonstrated in the following manner. Having constructed the figure M O (to the left in fig. 9) in which the width of the principal lines is say 2 inches, and the distance apart of the perpendiculars is about 24 inches,



FIG. 9.

place it at right angles to the line of sight, at a distance of about 6 feet from the eye, before which a prism of 10° is given

considerable inclination to the visual axis, with its base in or out, and as shown in the diagrams, fig. 9, which should suffice to indicate both methods and their results. The eye in each instance is to be placed directly opposite to the figure M. With these facts in mind we may return to our subject of measurement.

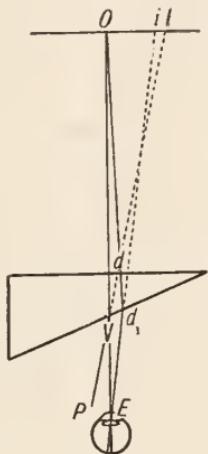


FIG. 10.

In fig. 10 the relative positions of the object of fixation O, the prism, and the eye are shown. It is evident that the perpendicularly incident axis O V of the conical pencil of rays emitted by the object O coincides with the visual axis, and that the axis of the refracted pencil V P *does not* enter the eye, although it *does* define the deflection O I which it is desired to ascertain. The axis of the refracted pencil, d₁ E, which *does* enter the eye, however, will result from that incident pencil whose axis is *oblique* relatively to the normal at d, and it will therefore be a ray approaching direction for minimum deviation and will consequently suffer less refraction than the refracted pencil whose axis is V P.

Now if, as is the case with the prismometer, the observer reads the deflection O i at the finite distance marked, say "10", upon the graduated bar, it is evident that an error will be com-

mitted, since 10 times O i will be less than 10 times O I³; yet this seeming weakness in my previous papers has escaped detection by the critics of the prism-dioptry system, and for the consolation of whom let it now be said that there could have been no reasoning so clever or ingenious on their part as to have made this error any the less apparent, *even in a prism of 10°*, by merely contrasting the differences between arcs, sines and tangents, in a choice for the unit of measurement; besides, a mere consideration of the well known relative goniometrical values of these has not hitherto been pertinent to the discussion, since the proposed unit, the prism-dioptry, is not a goniometrical unit, but an *optical unit*. The desire to multiply any *unit in optics* should be curbed by a knowledge of the fact that all the fundamental optical laws are based upon the assumption and acceptance of *values of limited magnitude*, and that there is therefore apt to be a point where *unreasonable* multiplication of an optical unit will contradict the actually existing optical phenomenon. *A warning to this effect was given in speaking of the decentration of lenses* (see page 129 of my second paper).

Even *thickness*, a dimension which we are taught to neglect with respect to ophthalmic lenses, becomes an appreciable factor in prisms above 10°, when we attempt to measure their deflection at short finite distance. This will be apparent from the following considerations.

It has been shown that the ray, which in the nearest limit reaches the eye, is the axis O d, fig. 11, of an *oblique* pencil, being refracted within the prism A B C from d to d₁, and thence in air to the eye E, which projects it to i, upon the scale O I. For a given thickness of prism, this is the *only* pencil which will be received by the eye, since, if we increase the thickness by allowing the plane A₁ B₁ to represent the anterior surface of the prism, the original incident axis O d will be refracted at v instead of d, when the axis of the refracted pencil will traverse

³This will be equally true for measurements taken from an arc at short finite distance.

the path vv_1 , P_1 to the left of and parallel to dd_1 , E. The refracted pencil which would enter the eye, for the indicated *increased* thickness, could only accrue from an *increased* obliquity of the incident axis Ou . The latter would therefore even more closely approach position for minimum deviation, from which we are to conclude that the deflection noted upon the scale OI by the eye will be *least near the base* and consequently greatest near the apex of the prism.

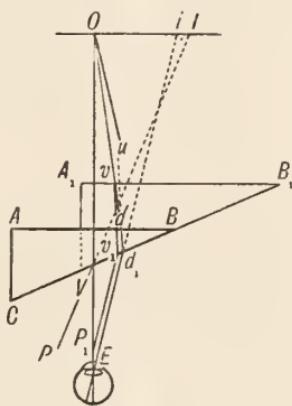


FIG. 11.

This is really proven to be the case by experiment with the prismometer. At the distance marked "10" upon the bar, the index-plate-reading near the base of a 22° prism, $1\frac{1}{4}$ inches square, is found to be 1.79, whereas at the feather-edged apex it is 1.89, so that the prism in the former instances measures 17.9 P D, while in the latter it is 18.9 P D. The same prism measured by the prismometric scale at 6 meters reads 20 P D. The error committed by measurement through the apex, at short finite distance, is therefore 1.1 P D, while the increased thickness at the base still further increases the error by 1 P D. The error will consequently be least, *in prisms of high degree*, when readings on the prismometer are taken at the apex of the prism, and it will be reduced to a minimum, *throughout the principal refracting plane*, when the deflection is measured for

pencils which are *perpendicularly incident to all points of the prism-surface*, that is to say, when the pencils of light are *cylindrical*, and which will practically be the case when the object of fixation, *a line*, is situated at 6 meters distance. In fact it will be better to measure all prisms above 10° at this distance.

This sharply defines both Dr. Burnett's and my own reason for advocating the tangent plane for the position of the scale, since it will be infinitely more *convenient* to place such a scale upon a flat wall, with which every office and workshop is provided, than to *contrive* an arc of 6 meters radius.

Other advantages of the scale at a 6 meter distance were mentioned in my second paper, when referring to hyperphoria.

The above facts do not lessen the value of the prismometer, which I have repeatedly and specifically represented as being of importance to opticians in filling oculists' prescriptions, in which the prisms do not exceed 5° , and by reason of which the error is so slight as to be inappreciable, yea, even in a prism as high as 8° , when an attempt is made to verify measurement by the prismometric scale at 6 meters.

It was also to be supposed that all oculists and opticians would not provide themselves with prismometers, in which event it was further anticipated that the prismometric scale would have to be resorted to, and more particularly now that hair-splitting fractions of the unit are not considered to be of value.

A more simple and convenient means of verifying the opticians' work could not be placed in the hands of the oculist.

The prism dioptry does not exclusively depend upon trigonometrical laws, nor rest solely upon the adoption of a specific instrument, but it is based upon a principle which is easily understood and capable of being practically applied within the confining limits set by the fundamental laws of optical science; and it must further be apparent that the generally irrelevant criticisms which have appeared in print have not, thus far, proven anything to the contrary; while it must be equally

clear that this paper contains a review of the optical laws and phenomena which must be considered in the choice of a unit, and that these will require to be thoroughly understood, before anyone can undertake a rational criticism of the subject. However, it is admitted that a perpetuation of the present degree system, together with the commonly accepted approximations which must accompany its application in practice, will obviate such pains being taken.

TWO CASES OF SUCCESSFUL SKIN-GRAFTING UPON THE EYELID, BY THIERSCH'S METHOD.¹

BY SAMUEL THEOBALD, M.D.,

Ophthalmic and Aural Surgeon to the Johns Hopkins Hospital and to the Baltimore Eye, Ear and Throat Charity Hospital.

Having had the opportunity of observing in the surgical wards of the Johns Hopkins Hospital the very happy results which have been obtained there from the adoption of the method of skin grafting proposed by Thiersch, I was prepared to resort to it with confidence should a suitable case occur in my ophthalmic practice. Two such cases have occurred during the past year, and the result in each has shown that my confidence was not misplaced. The successful outcome of these cases is the more noteworthy in view of the fact that they were both treated as out-patients, one at my office, and the other at the dispensary of the Baltimore Eye, Ear and Throat Charity Hospital, and that the antiseptic precautions employed in each were far from perfect. In both, the grafts were removed with a small slender scalpel, from the inside of the forearm, the skin from which they were taken having been washed first with soap and water, then with sublimate solution and lastly with a solution of common salt.

While the wound was being prepared for their reception, the grafts were placed in a warm, unsterilized solution of salt, the strength of which was not accurately gauged. They were somewhat less than half an inch in width and of varying

¹A paper read before the American Ophthalmological Society, at its recent meeting in Washington, in connection with the Congress of American Physicians and Surgeons.

lengths, some of the longer strips having been cut in pieces in order to make them fit more accurately the spaces upon which they were grafted. No antiseptic was applied to the wounds upon which the grafts were placed. Their granulating surfaces were in part shaved off (as recommended by Dr. Halstead) and in part scraped, and the bleeding surface which was thus produced was wiped off with non-sterilized absorbent cotton; dipped in the warm salt solution. After the grafts were in position, they were covered with "rubber protective," which, except in one instance, had not been sterilized, and over this was placed lint or absorbent cotton and a retaining bandage.

In one of the cases, that of a laboring man, about 25 years of age, the wound which made the grafting necessary, and which involved, besides other portions of the face, nearly the whole of the upper lid, the brow and the temple upon the right side, was the result of a burn by sulphuric acid, which had been purposely thrown into the individual's face. The first grafts, three in number, were made sixteen days after the receipt of the injury. Three days afterwards three more were made, and two days later five more. All of the grafts "took" well with one exception, and a portion even of this one lived and grew.

They were applied over nearly the whole of the upper lid, upon and above the brow, and upon the temple in the neighborhood of the outer canthus. One week after the last grafts were applied the notes of the case state "there is no surface on or near the lid which is not covered by epidermis." Five months have now elapsed since the injury occurred, and the outcome of the treatment is, that while the lid is considerably shortened, and near the outer canthus does not lie in complete contact with the eyeball, it is not everted at any point and closes well over the cornea. Massage is being practised upon the lid, and I have not been able to detect any increase in the shortening or in the tendency to erosion during the last three months. Had the skin grafting not been resorted to in this

case, there is, I think, little doubt that a marked ectropion would have developed before this time.

In the other case, the wound which called for the application of the grafts was due to the removal of an epithelioma from the lower eyelid. The patient was a railroad watchman, and about 50 years of age. The growth was removed with a sharp curette, supplemented by the application of the thermo-cautery. Five days later the charred tissue was removed, the granulations were scraped, and three small grafts were applied. The "protective" used in this instance had been thoroughly sterilized. Two days later the protective was removed and it was found that two of the grafts, and a part of the third one, were living. The death of a part of one of the grafts appeared to be due to the fact that the charred tissue had not been thoroughly removed from the whole of the surface upon which it was placed. The protective was re-applied, and worn for three days longer, when, as the grafts had united firmly, it was left off permanently. The patient was seen but once after this, and the ultimate effect of the treatment is not known. I have recently tried to communicate with him, but I regret to say, without success.

FOUR CASES OF REFLEX AMBLYOPIA.

JOHN DUNN, M.D., RICHMOND, VA.

Of the following four cases the first two have been reported at length, and are mentioned here only because they complete the picture showing that amblyopia may result reflexly from irritation of any of the three branches of the 5th nerve.

I. Mr. C., struck in the right eye with a snowball, injuring the supra-orbital nerve. More or less trouble began immediately with his eye, which troubles gradually increased until, $3\frac{1}{2}$ years later, the following symptoms presented themselves. Amblyopia, V. O.D. = $^9/_{cc}$, V. O.S. = $^{18}/_{c}$. Amplitude of accommodation for Jaeger's 2 was 2 cm. Concentric contraction of both fields of vision, greater for O.D.; clonic spasm of the accommodation. Amblyopia not due to this, however, as use of atropine and correcting glasses did not improve vision. Eye extremely sensitive to light and painful in cold weather. Presence of a cloud, whose density varied from time to time, before both eyes. Hyperæmic condition of conjunctiva. No changes in the fundus—clonic spasms of the inferior palpebral fibres of the orbicularis. Subcutaneous section of the right supra-orbital; one month later every symptom of reflex trouble had disappeared. V. O.D. and O. S. $^{18}/_{xv}$.

II. Patient struck with a stone over left supra-orbital nerve. Identical with I, except that the symptoms had existed only four months when the patient was seen. V. O.D. = $^{18}/_{xl}$, O.S. = $^{18}/_{l}$. Concentric contraction of fields, etc. Same further history, with restoration at the time of V. to normal by section of the supra-orbital nerve.

III. Mr. B., æt. 18; complained that he was unable to read without pain to his eyes, especially the left. Examination

showed complete paralysis of left facial nerve, which had been of some weeks' standing. Inability to close the left eye; characteristic want of symmetry of the two sides of the mouth, which is drawn to the right; inability to whistle; some change in speech, etc., etc. Patient could make out with O. S. some of the letters in $^{18}/_{xx}$; with O.D. some of the letters in $^{18}/_{xv}$. This could not be improved with the use of proper glasses, even when pupils were dilated with atropine. Field of vision for O.S. was slightly, but certainly, contracted. No diminution for the field of O.D. could be shown with the perimeter, yet it is highly probable that it was keeping pace with the loss of vision (Patients with full vision read $^{18}/_{15}$ Snellen perfectly, and most of them $^{18}/_{10}$). The pain caused by attempts to read, although the patient was somewhat hyperopic, was probably due to reflex interference with the ciliary muscle. Examination revealed as probable cause of the paralysis an abscess at the root of second molar of inferior maxilla of the left side. This tooth was drawn, when, after a few days under treatment, the paralysis disappeared and with it the ocular symptoms. Vision became full for both eyes.

IV. Mr. P., aet. 59; on June 6, 1891, fell against the foot-board of his bed and struck his right cheek just below the lower margin of the orbit. The pain was severe at the time; the right side of his face became so swollen that his right eye was closed, and on the following day he was unable to open his mouth (probably due to contraction of the muscles of mastication). He could not feel his hand when he rubbed it against the right side of his nose. The right half of his upper lip became insensitive, so that it was no longer painful to pull the hairs of his moustache on this side. His nose became stopped up so that he could not breathe through it (sensation due to the insensitive condition of the nasal mucous membrane of this side). The inability to open his mouth continued to such a degree that for two or three weeks he was compelled to subsist on milk, which he sucked into his mouth from bread soaked in this fluid. The teeth on the right side began to ache and finally ulcerations began in the gums. When I saw

the patient first, on July 22, the mucous membrane of the gums and of part of the right side of the upper jaw and adjacent mucous membrane of the cheek are nearly insensitive, *i. e.*, the pain produced by forcing the point of a knife into it was very slight as compared with the pain produced by same procedure on other side of mouth. Attempts to separate the teeth for more than half an inch are very painful. In pulling back the upper lip it was found that the upper lateral incisor and bicuspid of the right side were absent, and the adjacent gum was healthy; the canine tooth and second bicuspid were present, and the mucous membrane above each was in an ulcerated condition. The patient complained especially about loss of eyesight since the receipt of the blow. There was slight ptosis of the right upper eyelid, but not enough to interfere with vision. There were also slight clonic contractions of the inferior palpebral fibres of the orbicularis, a constant reflex symptom in Cases I. and II. I was unable to make out contraction of the fields of vision, though I am not certain that the patient understood what was to be done by him when before the perimeter. Unfortunately this patient belonged to the uncertainties of a clinic, and I was unable to follow the history of the case. One point, however, interests us in it, the injury to the intra-orbital nerves, followed by complaints of impairment of vision. There was no visible trouble of the fundus or media.

The four cases show that injury to any of the three branches of the 5th nerve may give rise reflexly to amblyopia. The first two cases show the amblyopia resulting from injury to the supra-orbital branch of the ophthalmic; Case II, to injury of the terminal branches of the superior maxillary; Case III, to inferior dental branch of the inferior maxillary. The amblyopia, that is, the diminution of the visual acuity, reflex upon injury or irritation (especially the latter) of some branch of the 5th nerve, has with it, it would seem, a host of companions whose presence serve to separate this form of amblyopia from those due to other causes. From examination of the above cases we find that the diminution in vision is accompanied by

diminution in the fields of vision; diminution in the amplitude of accommodation (due to ciliary spasm, clonic); diminution of the light-resisting power of the eye; hyperæmic condition of the conjunctiva; slight clonic contractions of the inferior palpebral fibres of the orbicularis in all cases except No. III, where there was complete paralysis of the facial; presence of a cloud before the eyes in Cases I and II; slight ptosis in Case IV. The intensity of all the symptoms varies from time to time, with a general tendency to increase as long as the cause of the irritation remains. The amblyopia and its accompanying symptoms are severest in the eye of the side upon which the irritation to the nerve exists; but if the irritation continues for a sufficiently long time both eyes become affected, the first eye showing the symptoms to a greater degree.

In none of the above cases, although one of them had existed for three and a half years, did any nutritive trouble of the eye, such as corneal ulcer, etc., supervene. The fundus remains normal. There seems to be good reason to believe that the prognosis in these cases is good where the cause of the trouble can be removed; that is, that the results of the continuous excessive energy on the part of the eye nerves, called forth by a persistent focus of irritation in some branch of the 5th nerve, are not permanent after the focus of irritation has been removed.

A CASE OF CHOKED DISKS WITH UNIMPAIRED VISION.

BY DAVID WEBSTER, M.D.,

Professor of Ophthalmology in the New York Polyclinic, and in Dartmouth Medical College, Hanover, N. H.; Surgeon to the Manhattan Eye and Ear Hospital.

Rev. Z. D., æt. 36, consulted Dr. C. R. Agnew in the spring of 1873 on account of asthenopia. Dr. Agnew found that he had simple myopic astigmatism, and ordered glasses for him: right eye, $-1/42$ cyl.; left eye, $-1/48$ cyl., which gave him vision= $20/xx$ in each eye. Mr. Z. did not appear again at our office until August 22, 1879, when he gave the following history: He has not used the glasses for the last two years because he has not seemed to need them. He had been preaching since last January in North Carolina. For the last four years he has been troubled with malaria which he got in New Jersey. Two and a half months ago he went out, on an intensely hot day, and walked in the sun without an umbrella, for some time. That night he was attacked with a "bloated feeling" in his stomach as though fermentation were going on in that organ. The next morning, Sunday, he could eat no breakfast. He attempted to hold service, but fainted when about half through. The following Tuesday or Wednesday he began to have severe headache, and in ten days he went to Blue Ridge Mountains. He was taken sick as soon as he got there and was confined to his bed for twenty days with "neuralgic" headaches. He was delirious part of the time, and his physician said that his headache proceeded from enlargement of the liver. About three weeks ago he began to have confusion of vision, double sight, and dizziness. A week later he saw Dr. Leaming who prescribed muriate of ammonia for his

head symptoms, which he is still taking with some benefit. His urine was examined in the Mountains, and was found to contain a little bile, but nothing else abnormal. He had frequent attacks of vomiting in the Mountains, but none since he came to New York. He still has severe and constant headaches.

Right eye, V.=²⁰/xx with + $\frac{1}{48}$ s. \bigcirc + $\frac{1}{48}$ c. axis 90°.

Left eye, V.=²⁰/xx with + $\frac{1}{60}$ s. \bigcirc + $\frac{1}{60}$ c. axis 90°.

Paresis of left external rectus. On thrusting tongue out it deviates to the right. For the last three or four weeks he has had a throbbing in his ears corresponding to his heart-beats—a sort of pulsating tinnitus. Hearing: Right ear=¹²⁰/₆₀; Left ear=⁶⁰/₆₀. Inspection shows nothing abnormal in either case. The patient says he never had venereal disease.

Ophthalmoscopic examination shows "choked disks." Disks swollen $\frac{1}{16}$ each. Retinal vessels buried in spots by exudation in immediate vicinity of disks. A few minute blood-extravasations on discal borders.

Dr. Agnew ordered two leeches to each temple, smoke coquilles, bromide of potassium for his headaches.

August 25. Dr. Agnew thinks it must be a case of intracranial tumor. Ordered mercurial inunction.

The patient remembers that a year and a half ago he was attacked during service, without known cause, with a severe headache across the top of his head, and he became almost unconscious. The attack lasted five hours and passed off gradually.

He had two less severe attacks four and eight days previously. His physician ascribed these attacks to malaria.

August 26. The headache is less severe.

Right eye, V.=²⁰/xx with + $\frac{1}{60}$ s. \bigcirc + $\frac{1}{60}$ c. axis 90°.

Left eye, V.=²⁰/xx; no glass accepted.

August 29. The patient remembers that about fifteen months ago he was thrown from a buggy and drawn along about twenty feet, the hind wheel of the buggy resting on his left side. He drove home, however, after the buggy was

righted, but had to stay in bed for three days on account of muscular soreness.

His urine, examined by Dr. E. A. Maxwell, showed:

1. Narrow hyaline casts.
2. Narrow hyaline, finely granular casts containing one or two cells of tubular epithelium.
3. Tubular epithelium, free.
4. Oxalate of lime.
5. No albumen or sugar.

August 30. The patient went to see Dr. Leaming this morning, and on his return, suffered severely for an hour and a half with cramps in the stomach, vomiting and headache. In the afternoon he had a similar attack lasting three hours. At 10 o'clock P. M. I gave him hypodermically, Majendie's solution of morphia, $\frac{1}{2}$ x. He vomited soon after.

August 31. Was made comfortable by the morphia, but did not sleep till 5 o'clock A. M. when he dozed off for an hour or two. Stopped the mercurial inunction. Dr. Leaming gave him calomel grs. xxx yesterday, and also prescribed a sweat. His mouth is "touched."

September 1. Drs. Agnew and Leaming met in consultation and put him on a milk diet.

September 9. The patient was put upon iodide of potassium, a saturated solution, 10 minims three times a day, and to increase the dose 5 minims daily.

September 14. He is taking 45 minims of the solution of iodide of potassium three times a day.

This morning at 8 o'clock, while lying quietly on his back, he felt as if something burst or broke in his left side in the region of the kidney. The most agonizing pain set in at once. He took two doses of elixir of opium, 20 drops each. I saw him at 9:20 when, the pain being unabated, I gave him hypodermically, 10 minims of Magendie's solution of morphia, and ordered hot fomentations to his abdomen.

Dr. John G. Curtis was called in consultation and suggested that the pain was caused by the passage of a renal calculus. I saw him again at 12 o'clock, when the pain being more intense

than before and having extended over the region of the bladder I gave him another hypodermic injection of morphine and applied a large mustard poultice over the whole painful region. At 2 o'clock P. M. the patient was easier.

September 15. Dr. Agnew saw the patient, and as the pain was still very severe, he ordered chloral hydrate grs. v, to be taken with McMunn's elixir of opium, m xv.

September 16. The patient took two doses of the above and vomited half an hour after he took the second dose, and the pain was not relieved. He suffered very severely with pain, all through the lower part of the abdomen from 10 P. M. to 2:30 A. M., when I was called and gave him 10 minims of Magendie by the skin. This blunted the pain and quieted him. At 1 P. M. I gave him 10 minims of Magendie and the same at 5 P. M., after consultation with Dr. Austin Flint, who inclined to the opinion that he has "granular contracted kidney," renal calculus, and basilar meningitis. Dr. Flint advised to administer opiates sufficient to relieve the pain and to sustain the patient entirely by fluids.

Dr. Maxwell examined another specimen of his urine at this date and found:

1. Narrow and medium hyaline casts, from two to six on a slide.
2. Tubular epithelium, scanty.
3. No albumen.
4. Oxalate of lime.

At 10:30 o'clock I gave him another hypodermic of 10 minims of Majendie.

September 17. The patient has had no pain since I left him last night and has slept soundly. He is considerably under the influence of opium, but is easily roused.

September 18. Ordered acid. nitro-muriatic. dil. minims viij, t. i. d.

September 25. Right eye, V.=²⁰/xx with + $\frac{1}{60}$ c. axis 90°.
Left eye, V.=²⁰/xx; no glass accepted.

He has diplopia on looking far to the left. Insufficiency of external rectus 4° at 20'.

Ophthalmoscopic examination shows the optic papilla hypermetropic $1/24$ in each eye. There are no retinal haemorrhages or exudations remaining, but simply a diminished swelling of the optic discs.

The subsequent history of the case was given me by his widow some years later. About two months after the above note was made the patient consulted Dr. T. E. Satterthwaite, who was inclined to think him a hypochondriac. He then drifted into the hands of an advertising charlatan who treated him with electricity. The first application made him unconscious for about an hour, the second less than an hour, the third still less, and the fourth had no unpleasant effects. He considered himself benefited by this galvanic treatment. He died in March, 1887, while under the care of a homœopathic physician, Dr. Clark, of Harlem. He is said to have died of "uraemic poisoning thought to be caused by cancer of the liver," but there was no autopsy.

Mrs. Z. D. stated that her husband's eyesight was perfect, with his glasses, so far as he could judge, as long as he lived. Whether more or less optic neuritis remained throughout his life, or whether the papillitis was eventually replaced by apparent atrophy, no one will ever know.

CORRESPONDENCE.

CORRECTION.

MACON, GA., October 24, 1891.

EDITOR AMERICAN JOURNAL OF OPHTHALMOLOGY.—In the September number of THE AMERICAN JOURNAL OF OPHTHALMOLOGY, in my remarks upon Homatropine, page 311, 3d line from bottom, there is a misprint. It reads *marked* astigmatism. It should read *masked* astigmatism.

R. O. COTTER, M.D.

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ORIGINAL ARTICLES.

SOME PECULIARITIES IN THE REFRACTION
BY TILTED LENSES, GRAPHICALLY
REPRESENTED.

BY SWAN M. BURNETT, M.D., PH. D., WASHINGTON, D.C.

The fact that an astigmatic refraction followed from a position of a spherical lens oblique to the incident pencil has been known for a long time, the instance most familiar to ophthalmologists being the well-known one of Dr. Thos. Young, who demonstrated his ocular astigmatism as due to an oblique position of the crystalline lens, relative to the optical axis of the eye. The subject was first treated of, experimentally and mathematically, in this country, by Pickering and Williams¹, in 1875. Of late, attention has again been called to it from a mathematical standpoint by Holden² and by Green.³

Neither of these two latter contributions, while in the main accurate and carefully worked out, contains anything essen-

¹Proceedings Amer. Association of Arts and Sci., 1874-75.

²Knapp's Archives, 1891.

³Amer. Oph. Soc., 1890.

tially new, or what cannot be found in the works of Heath⁴ or Aldis⁵, where, indeed, the matter is handled in a most thorough manner, mathematically. Holden, in his history of the literature of the subject, makes no mention of these works; an omission we make good here, not only on account of this special instance, but also because the student of optics will find in them, probably, the best guides to be had in the English language in working out many of the problems with which he has to deal.

While preparing my "Treatise on Astigmatism" (1887), I made a number of experiments with the phakometer of Snellen to verify the findings of Pickering and Williams, and in the course of these investigations discovered some phenomena to which I had nowhere found an allusion. My discovery was⁶ that while in a tilted spherical lens of our ordinary trial cases, there was an astigmatic action with two focal areas, and what corresponded to a focal interval of Sturm, these focal areas were not, or at least the posterior was not, perpendicular to the optical axis, or the incident ray. The posterior focal area was, on the contrary, oblique to the line of direction of the incident ray and in a direction opposite to the obliquity of the lens; that is, if the lens were inclined 30° in one direction, the screen on which the image falls must, in order that the image approach most nearly to a line, be rotated, not so as to be parallel to the lens, but 30° in the opposite direction, so that planes passing through each would meet, if prolonged. So far as I am aware, this special phenomenon has not been treated of mathematically, nor is it even referred to by Pickering and Williams, or Holden or Green, and only in a very general manner by Heath and Aldis. It is readily understood that this would be a difficult if not an impossible problem to deal with by the ordinary formulae, because these, as laid out by Gauss and his followers, deal only with lenses of limited am-

⁴Geometrical Optics, Cambridge, 1889.

⁵Geometrical Optics, Cambridge, 3rd edition, 1888.

⁶Published at the time in the Amer. Jour. of Ophthalmology for January, 1887.

plitude, in which the arc, sines and tangent are considered as the same. It is evident that in tilted lenses these simple formulæ no longer apply, and for their mathematical elucidation much more elaborate equations will be required. It is also true, I think, that the phenomena are due largely to the causes which produce ordinary spherical aberration, though the use of diaphragms, unless very small, does not do away with the appearances entirely.

Since this paper has been put in type, Mr. C. F. Prentice has repeated the experiments and confirmed the phenomena; and shown, by construction, that they are due, as above indicated, to the laws of spherical refraction operating on a surface of large amplitude. It is hoped that the diagrams illustrative and explanatory of this may be published soon.

Pending, however, a mathematical solution, I have thought it would not be without interest to give a representation of the forms of the focal area of a point of light, the rays from which are refracted by a spherical lens in one special tilted position. The lens chosen is 10 D., from the test-case, and in Fig. I. we have the focus at 10 cm. of a gas jet, 20 feet away. Fig. II. is the focal area when the lens is rotated 35° on its vertical axis, the screen remaining at right angles to the line of direction of the incident rays. Fig. III. shows this area, when the screen is placed at an obliquity of 35° in a direction opposite to the inclination of the lens. Fig. IV. is the focal area on the screen when it is at right angles to the direction of the incident pencil, but at 9 cm. from the center of the lens. Fig. V. is the form it has at 8 cm., and Fig. VI. gives its form at 7 cm.

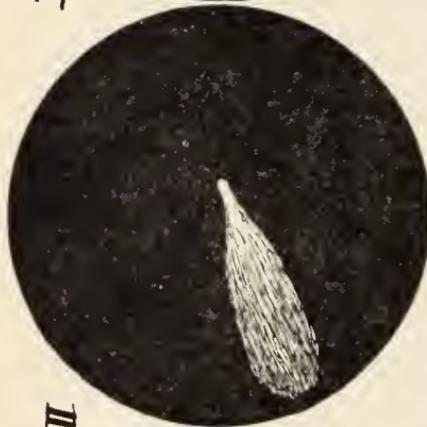
In studying the changes in the form of the focal area it is to be noted that instead of being horizontal it has a direction downward and to the left (the left edge of the lens being nearest the screen). As the screen approaches the lens it assumes a perfect screw surface in Fig. IV., the portions of greatest brightness being near the center, and a bright line bounding the right extremity. This bright line at the right end remains in all the figures, but the other one, as is seen, shifts to the



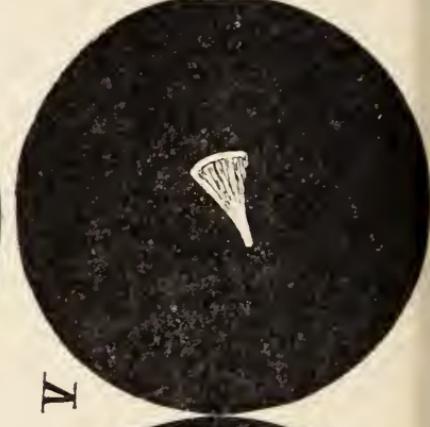
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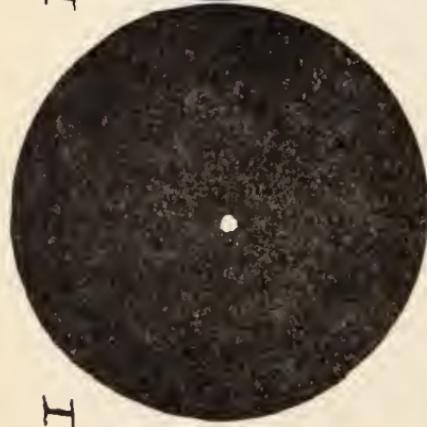
II



III



IV



V



VI

left extremity in Fig. V., and forms the apex of the brighter cone inside of the oval area, in Fig. VI.

As the screen is brought nearer than 7 cm. the oval of Fig. VI. broadens out into a large area of diffusion, in which the details are no longer to be made out. Fig. VI. represents what would be the anterior focal line in Sturm's interval, but it is a question as to whether one shall look upon II. or III. as the posterior boundary of the interval.

We could have used a more complicated and delicate apparatus and have secured, in that way, more and finer details, but what we wished to give was the refractive images in the tilting of an ordinary lens, as it would be used in the form of spectacles. The experiment is extremely simple and can be repeated by any one, with only a little care and trouble.

SOCIETY PROCEEDINGS.

REPORT OF THE DISCUSSIONS OF THE 24TH ANNUAL MEETING OF THE AMERICAN OPHTHALMOLOGICAL SOCIETY, HELD AT WASHINGTON, D. C., SEPT. 23 AND 24, 1891.

Paper by Dr. D. Webster: "Report of Cases of Cataract Extraction." Discussion postponed until all papers on the same subject had been submitted.

Paper by Dr. H. Knapp: "The Occurrence, Prevention and Management of Prolapse of the Iris in Extraction of Cataract."

Paper by Dr. J. A. Lippincott: "Routine Syringing-out of Cortical Matter in Cataract Extraction," as illustrated by one hundred cases.

DISCUSSION.

DR. EMIL GRUENING, of New York.—Dr. Knapp said in his paper that the old operators cut the Gordian knot. They had no cocaine in those days. Those who operated in the days when cocaine was not used will remember that the iris always prolapsed when they opened the anterior chamber, and this was a welcome sight, because they wished it to prolapse, and then cut it off. Now it does not come out but remains in the anterior chamber, and we want it; therefore I cannot see that we are in the position of the old operators. We are not obliged to cut it. The iris remains in the eye because there is hypotony of the eye induced by cocaine. The gentleman who read the first paper on cataract says that the cocaine

should be instilled until the dilatation of the pupil comes on. Now it is known that if we use a 4% solution of cocaine in order to produce dilatation, we shall have to wait at times fifteen minutes, at times even longer. If we instill a 4% solution of cocaine every fifteen minutes we shall often have such hypotony that the lens may not come out in spite of well-directed pressure upon the eye. Those who have had this experience will know how important it is to understand thoroughly how to cocainize. Dr. Knapp says, "cocainize thoroughly." That is not sufficient. How thoroughly? What is a thorough cocainization when we wish to operate. We wish to produce sufficient hypotony to act upon the iris in the eye and still not cause a hindrance to the exit of the lens. I have found that a 4% solution instilled fifteen minutes before the operation caused excessive hypotony in most cases; that instillation even for ten minutes before the operation causes too much hypotony, and I have reduced it to six minutes, and during these six minutes cocaine is instilled three times. Then I get exactly what I want. Should eserine be instilled after the operation? I think eserine should be instilled after every simple operation for cataract. One per cent produces iritis in every case. A one-fourth per cent solution answered best in my cases. Even then a slight iritis could be observed, but a few slender adhesions are not only harmless, but really useful in retaining the iris in its position until the corneal wound is sufficiently firmly closed.

DR. C. S. BULL, of New York.—I think, and all who have done this operation will, I believe, agree with me, that prolapse of the iris is the one vicious factor in simple extraction, and that our labors in the future should lessen the frequency of its occurrence. I agree with Dr. Knapp absolutely as to the necessity of locating the corneal incision entirely within clear cornea just touching the limbus, the base line of the flap being just above or just below the horizontal meridian. I do not agree with him in the turning of the knife backward in order to form a small conjunctival flap because I believe a conjunctival flap is a vicious thing to make. I do not agree

with Dr. Knapp in his belief as to the effects of the eserine, nor am I as positive as Dr. Gruening is in regard to the danger of a one per cent solution of eserine always causing iritis. I have known very severe iritis in very many cases to be induced by a one-half grain solution. I never use a stronger solution than a one-half grain and usually employ a solution of one-tenth of a grain. This does not produce iritis and it does produce what we want. I use eserine in every case after the operation.

As regards the dressing of the eye, I agree with the reader of the paper that the plaster should be avoided. In almost all cases in my practice—it is a routine thing, I may say—I use a double-roller bandage in all operations for extraction of cataract, making the bandage of very thin material, particularly in very warm weather, and leaving it on one or two days. I still think that one of the strongest means we have for avoiding the occurrence of prolapse is to do the operation while the patient is in the bed in which he is to remain during his convalescence. That is the strongest means that I know of to avoid the occurrence of a prolapse. And one point in addition: When the prolapse happens, I believe in as early and as complete an excision of that prolapse of the iris after your operation as possible.

DR. HENRY D. NOYES, of New York.—I have studied very carefully this subject of prolapse of the iris, and I think that one point deserves more explicit mention than has been given to it in our discussion; in fact, it has been entirely omitted. Prolapsus of the iris is not an accident exclusively belonging to the simple operation. Cases of operation with iridectomy are accompanied by the same accident, only the prolapsus cannot affect the iris in the middle of the wound, but it presents itself at its angles, and everybody who has been accustomed to von Graefe's operation knows that incarceration of the iris is one of the ominous and serious occurrences belonging to that method of procedure, as it gives rise to cystoid cicatrices and to other complications. A recent writer in the last number of *Knapp's Archives of Ophthalmology*, reported

two hundred cases and puts the ratio at four or five per cent of the number as those in which it was found. I think if we should go over our old cases we should find that at least as much as five per cent of them were accompanied by incarceration of the iris at the angle of the wound.

But to come to the matter in simple extraction, I have summed up a number of cases as they have occurred to me, of this accident, from which I make the following statement: That a condition of plus tension at the time of operation is the first and most serious consideration, and that this plus tension is something as like a tendency to simple glaucoma inevitably invites prolapsus. It may or may not be overcome by cocaine, but if at the time of the operation there be plus tension you will get prolapse. The second condition which gives rise to it is the uncontrollable squeezing of the patient. A recent experience of that kind came to me in two negroes who came to the New York Eye and Ear Infirmary, and who made very powerful compression of the eyes by the eyelids. I operated on one eye at a time in each and both had a very large and copious prolapse of the iris. The operations were normal, but the squeezing was persistent and uncontrollable.

The third thing which seems to me to render this prolapse of the iris extremely liable is a rude operation; that is an operation accompanied by a certain amount of violence, thereby producing more or less reaction in the healing process, and I am sure that this favors the unhappy occurrence of the prolapsus.

The last is the traumatism. I am certain, as Dr. Knapp has said, that traumatisms to which we pay little attention are responsible for a great many of these occurrences, and not only within the first two days does it make its appearance, but at the expiration of six or nine days may it appear by reason of the secondary opening of the wound. I have seen that take place several times.

DR. SAMUEL THEOBALD, of Baltimore.—I wish to say just one word with regard to the production of iritis by the use of eserine. I am very glad to hear that Dr. Knapp, from his lat-

ter experience, believes that iritis is not apt to be produced by even the one per cent solution of eserine. If I remember correctly, both Dr. Knapp and Dr. Bull agreed at the last meeting of the Ophthalmological Society, that from their experience up to that time iritis was frequently produced by eserine, and that very weak solutions of eserine must be used if we wished to avoid iritis. At that time I made the remark that my experience had been quite different; that I had usually employed a solution of the strength of four grains to the ounce, and that iritis had been an extremely rare occurrence.

If I am right in my recollection of what Dr. Knapp's earlier experience was, I congratulate myself that this later experience of his so closely coincides with my own.

DR. REEVE, of Toronto.—At the discussion before the Society last year, I expressed the opinion that iritis was frequently produced by a bruising of the iris during exploration and not by eserine.

DR. W. V. MARMION, of Washington, D. C.—In the first year of my professional career, I practiced the flap extraction without iridectomy, using the Beer knife to make the section. The various accidents attendant upon this form of operation, particularly suppuration of the cornea, led me, as it did, I may say, every one, to adopt Graefe's modified linear procedure, and it is this method that I follow to-day, with one modification. I always make a small upward iridectomy from three to six weeks in advance of the extraction of the lens as originally suggested I think by Mooren of Duesseldorf, taking care that the iris is not caught, to the slightest extent, in the angles of the wound; and my results are so very satisfactory that I can see no reason for changing to the method under discussion, which is simply a revival of the flap operation, the narrow Graefe knife being used instead of the Beer. I practiced this method five times two years ago, and had prolapse of the iris in two of the cases on the third day. Abscission was done in one case; and was followed by intense reaction and impairment of vision, the prolapse re-forming after a few days. I enlarged the coloboma and the hernia being reduced,

I passed a flat needle into the fistulous opening and gently scraped the edges, securing complete union in a few days. It seems to me that one cause of prolapse of the iris is the concaving of the corneal lip of the flap when making the section, in part at least, down to the membrane of Descemet, thus preventing perfect coaptation of the edges of the wound. Cocaine in a four per cent solution frequently toughens the cornea to such an extent that it is almost impossible to puncture it. I find a two per cent solution answers much better.

Of eserine in the treatment of cataract, I have had no experience, but I have seen destructive iritis follow its use in the treatment of glaucoma, the solution being one grain to the ounce.

DR. H. KNAPP, of New York.—With regard to eserine, I believe with Dr. Reeve that iritis is frequently due to the bruising of the iris during the operation. I believe with Dr. Bull and Dr. Gruening that eserine favors the occurrence of iritis, but when there are no anatomical conditions to cause iritis, a 1% solution of eserine may be instilled without fear. The mode of preventing iritis is to avoid bringing two raw surfaces together, the lacerated capsule and the lacerated pupillary edge of the iris. Those who make peripheric capsulotomy will notice synechiae only at the place where the capsule is opened. During the passage of the lens through the pupil the free edge of the iris is stretched and lacerated in several places which can easily be seen. These lacerations become invisible when the iris is reduced and gives rise to posterior synechiae only when the lens capsule is opened in the center. When the lens capsule is incised at the periphery only, the instillation of 1% solution of eserine produces no iritis, a fact which I can demonstrate any day at the hospital.

Paper by Dr. G. R. de Schweinitz, of Philadelphia: "A Case of Acute Glaucoma Occurring in the Eye with Coloboma of the Iris and Supernumerary Pupils," Illustrated.

Paper by Dr. B. L. Milliken, of Cleveland, O.: "A Partially Bony Growth of Orbit—Removal—Recovery."

Paper by Dr. C. S. Bull, of New York: I. "Gout Retinitis."
2. "Neuro-Retinitis and Chorio-Retinitis."

DR. HEYL, of Philadelphia.—With reference to this Schoeler operation, of course it is a matter which interests us very much because it deals with a very dreadful disease. I have gone over Schoeler's monograph on the subject, and have come to the conclusion that the remedy is about as dreadful as the disease, and the experience of Dr. Bull will go far to confirm me in this conclusion. So that for myself I am utterly disinclined to attempt it at all. I am not sure that the pathological principle upon which the operation is based is correct. I do not deny the existence in retinal separation of the tear through the retina or of the vitreous bands, but I am rather inclined to think that that is not the whole of the process, and I believe that we shall never get at the true rationale until we understand the principles underlying the tension of the ball. Meanwhile I believe that the procedure had better be done away with.

DR. T. R. SUTPHEN, of Newark, N. J.—May I ask Dr. Bull if there was a suppression of the intracranial fluid?

DR. BULL.—No sir.

DR. T. Y. SUTPHEN.—I recall three operations in cases of this kind which I reported to this Society in 1888; one of which was eminently successfully, the operation being a simple puncture. That case has good vision to this day. He is slightly myopic with vision $20/xxx$.

DR. DAVID WEBSTER of New York.—I want to thank Dr. Bull for making these experiments for us. One thing I would like to inquire about. He reports that in two cases panophthalmitis occurred, and yet the resulting vision was very considerable. Now he must put a different meaning to the term panophthalmitis than that which I have learned. I have always thought that a case of panophthalmitis left nothing beyond a mere perception of light.

DR. BULL.—These were cases of intra-ocular inflammation starting in the vitreous or choroid, and so far as it was possible to judge from external manifestations involving all the principle tissues of the eyeball. There was enormous chemo-

sis, enormous swelling of the eyelids protrusion of the eyeball, excessive pain and increases of temperature.

DR. SAMUEL THEOBALD.—I think that all of us have seen cases of at least traumatic panophthalmitis where with the patient seen early enough by rapid and persistent efforts we have reduced the inflammation so that the trouble lasted only a few days, and left a certain amount of vision.

DR. C. S. BULL.—Dr. Webster is mistaken in stating that I reported that the vision was good in these cases. It was bad, very much worse than it had been before the operation was attempted.

DR. SAMUEL J. JONES, of Chicago.—May there not be a factor of disturbance in the use of the iodine?

DR. C. S. BULL.—The iodine being used as an antiseptic and preventing the process which is generally the result of panophthalmitis, that may explain the difference between the destruction of the tissues which we have seen and the report of the cases as given.

Paper by Dr. Hasket Derby, of Boston: "The Significance of Macular Changes in Advancing Myopia."

DR. HENRY D. NOVES.—I would like to say one word upon this subject: We see this condition often in eyes that are not myopic. It is by no means an uncommon experience with me to have persons of advancing age, as they approach sixty for example, to exhibit just such changes at the macula that are so commonly seen in cases of myopia; and this in most instances appears to depend upon general failure in nutritive power; it occurs most frequently in emaciated individuals, though I have seen it occur in persons who were quite corpulent. These cases seem like simple erosion, and absorption of the tissues at the center of the eye and they have in my observation been just as hopeless as are the cases which occur in myopia. The prognosis is usually that they go on to a gradual deterioration of sight but I have never seen them lose all sight. The scotoma becomes more and more marked and I have rarely seen an arrest of the progress of the disease take place. The usual thing is that they go on to a gradual deter-

ioration, without absolute loss of vision at this part. But the prognosis is bad, and the treatment is of no avail.

DR. ALBERT G. HEYL, of Philadelphia.—I would like to say a few words with reference to the genesis of appearances of the kind described. They are usually ascribed to a form of choroiditis, but I wish to call attention of members to the effect of simple pressure as a cause. We all know there must be a certain amount of vitreous pressure in every eye, and the appearances from the effect of blows upon the eye (rupture of the choroid) show that when the force bears upon the *pigmentary* layer of the retina, then we draw the conclusion that the vitreous pressure bears upon the pigmentary layer. (? Editor).

For a fuller discussion, see *The Visual Axis*, by Albert G. Heyl, M.D., *Transactions of the 9th International Medical Congress*, Vol. III, p. 740.

Now it is impossible in three minutes to fully develop this, but in intrauterine life I believe that vitreous pressure bears upon the primordial retina and as a result the macula is formed by the splitting of the retina; but in extra-uterine life it bears especially upon the pigmentary layer of the retina, and if the vitreous tension be great, you may have a local injury or you may have a distributed injury disintegrating the pigment to a large degree. I believe that; in myopia you may see the same sort of pigmentary changes, and instead of being a true inflammatory condition, I believe that it is one of pressure. And you may have one of two forms; either localized, affecting the macula itself, or you may have the appearances such as have been described or distributed over a large section of the pigmentary area with a large destruction of pigment.

DR. SAMUEL D. RISLEY, of Philadelphia.—My observation of these macular changes in eyes with defects of refraction, particularly astigmatic eyes, has led me to regard them as but a part of the pathological history of the distending or stretching eye, and may be present before the eye has reached the stage of myopia. My experience in their treatment, however, does not fully accord with the very grave opinion expressed by Dr.

Noyes. Under the prolonged use of a mydriatic, rest and smoked glasses, to be followed by a carefully selected correcting glass, I have repeatedly seen these eyes get well. I believe not only that such treatment is fruitful of good results, but very important in the early history of macular inflammation of this class; and that such treatment will do much to avoid the serious macular disease so frequently seen in eyes with progressive myopia.

DR. EMIL GRUENING, of New York.—My experience agrees with that of Dr. Derby. Detachment of the retina in cases of this kind must be very rare. I think that we have here an inflammatory and adhesive process by which the retina and choroid are glued together. At one time I saw a patient who had such changes at several points in the eye, and between two points the retina became detached. Dr. Knapp also saw this patient and treated him finally. Dr. Knapp made a favorable prognosis in that case, and the retina actually became re-attached. The points of adhesion prevented the further extension of the detachment.

DR. EDWARD JACKSON, of Philadelphia.—As bearing upon the subject of the paper, I may say that I have two cases in mind, cases that I see or hear from occasionally, which I hope may prove the truth of Dr. Derby's observation. In one of these cases there has been extensive loss of vitreous of one eye; one has moderate myopia, the other hyperopia, but in either eye there are these choroidal changes going on. I have regarded them as probably the precursors of detachment, but I hope that that is incorrect. I cannot recall any case in which decided choroidal pigmentary changes have been followed by detachment.

In both of these cases that I refer to, the changes are perhaps a little different from the ordinary mass of changes of choroiditis in this, that the amount of pigment deposit is relatively large, the changes are decidedly greatest in the macula, and the amount of atrophy of the choroid is small; in one I think there is no atrophy at all.

DR. B. ALEXANDER RANDALL, of Philadelphia.—There are,

of course, a good many types of this central choroiditis beside the form spoken of by Dr. Risley, which we have often seen and treated, which has been described as ametropic, and which is certainly in some cases curable. You have, of course, all seen the severe—and such cases have been described which are evidently beyond any help—types of this disease, and we have also seen those cases which have been described as central senile choroiditis, which become more and more marked as time goes on and which are in like manner irremediable. I would like to call attention to a point which is usually overlooked, and which is probably as rare in the experience of others as in my own, where we have a flask-shaped incision of the retina such as Jaeger has pictured. Of course I have seen but one or two cases. Jaeger shows one that is central at the macula and flask-shaped at the retina, but he does not in his picture represent what I have observed, a lesion of the choroid or pigmentary layers. It is possible we may have the retinal detachments in such cases not tending to progress, but going back to a normal position.

Paper by Dr. P. A. Callan, of New York, "Case of Orbital Traumatism, Followed by Immediate Monocular Blindness Due to Fracture of Foramen Opticum."

DR. ST. JOHN, of Hartford, Conn.—In connection with this paper of Dr. Callan's I should like to report a case of orbital traumatism unconnected with fracture of the orbit followed immediately by monocular blindness on the same side, for the reason that similar cases may happen in the experience of any of us—cases coming under our charge from a general surgeon.

In this case an operation had been done by a most excellent surgeon for the relief of tri-facial neuralgia; excision of the supra-orbital and infra-orbital nerves had been practiced and this was performed by a modification of the usual procedure which had been described at the last International Congress in Berlin last year.

The patient was an elderly lady, æt. 75, and in fair health. The operating surgeon found that there was more haemorrhage

than was usual. He had operated, at the same time, upon the infra-orbital and upon the supra-orbital nerves.

Although the haemorrhage was extensive, as I have said, it was not sufficient to cause him any alarm or anxiety. He closed the wounds and there was no special reaction. On the following morning the patient said she could not see. He noted that the pupil was dilated and sent for me. I found the pupil, on examination, dilated *ad maximum*, absolutely irresponsible to light; she had no perception of light, whatever, and no mobility of the eyeball in any direction. The immobility was just as complete as in any case of ophthalmoplegia externa. There was no plus tension; no glaucomatous condition. The ophthalmoscope showed congestion of the choroid and retina.

In the course of a few days the mobility of the eyeball began to return, but perception of light did not return, and has not to this year. This operation was performed four months ago. Mobility came back gradually, and the pupil contracted to perhaps two-thirds of this former dimensions, although remaining very sluggish to light.

My explanation—the only one I have to offer—was that this free bleeding had led to a clot, collecting at the apex of the orbit and involving the nerves running to the different muscles, as well as those surrounding the optic nerve, and that the contraction of the clot had caused the paralytic symptoms which followed. The case went on to atrophy of the optic nerve, which is now complete. I advised the gentleman who did the operation to re-open the wound, which he did, and syringed the orbit with a long slender-pointed syringe, hoping to break up the clot which involved this mesh of nerves at that point, and, if possible, free it from the contraction.

Whether the explanation I offered was the true one or not, I do not know. Perhaps as these operations are being done more frequently in these days it would be well to bear in mind to mention to our surgical confreres that they must be very careful with regard to cases in which there is free bleeding, and to relieve the orbit from the blood which collects there.

DR. MYLES STANDISH, of Boston.—I have had two cases in

my experience which are recalled by the paper just read by Dr. Callan, which I would like to mention as it may serve to relieve or prevent some member giving a false opinion some day. Each of these were medico-legal cases, one a young woman, the other a young man, who received an accidental blow and who declared that they were blind in one eye, and could see nothing by it immediately following the blow. In each of these cases there was reaction of the pupil to light and there was absolutely nothing to see in the fundus. I saw them both immediately after the injury at the instance of parties who were supposed to be responsible in each case. I said I believed that the patients were malingering. To my confusion and regret in each case three or four months after the injury atrophy, complete and perfect, ensued and the patients were absolutely blind. Of course, later there came on a dilatation of the pupil. But the thing that I wish to call attention to is that there may be a truthful statement from a patient after he has received an injury that he cannot see, though he may still have reaction to light; and that that injury may subsequently produce complete atrophy in that eye.

I remember also the case of a captain of an English steamer who fell into the hold of his vessel striking on the back of his head, and who, immediately following, had no vision in the right eye. I saw him within three days after the accident, but in his case there was the paling condition of the nerve, and following the accident there had been a sub-conjunctival haemorrhage. In this case there could be no mistake. As to the other cases, I do not undertake to explain their nature.

DR. DAVID WEBSTER.—The cases cited by Dr. Standish recall to my mind a somewhat similar case in which I was called in consultation about a year ago. A young married man had insured in an accident insurance company and the loss of his eyesight was equivalent to the loss of his life; that was, he would receive ten thousand dollars if it could be proved that the loss of sight extended over sixty days.

The accident happened in this way: He was going rapidly through the door of a barn, jumping through, and struck the

top of his head against the upper part of the door and was severely stunned. He had certain nervous symptoms; went home and vomited and within a day or two lost his sight entirely. He was seen by a friend of mine from time to time, who thought he was malingering and after several weeks had passed I was called to see the case and asked to give an opinion. I found the pupils perfectly responsive to light and of normal size. I found no lesion of the fundus whatever. I found nothing whatever to account for this blindness. Yet he certainly gave every outside evidence of blindness, certainly acted as a blind man would act, and there was every reason to believe he was blind. I accordingly gave that opinion. I happen to know that the man got his ten thousand dollars, but I have not heard whether he recovered his sight after receiving it or not.

DR. SAMUEL THEOBALD.—In connection with the case reported by Dr. St. John, of ophthalmoplegia following section of the supra-orbital nerve, I think it worth while to mention that I have seen one very marked case of right hyperphoria following and persisting after resection of the infra-orbital nerve on the right side. It was done by a very careful surgeon in Baltimore and there followed diplopia and very marked hyperphoria. When I last saw the case the hyperphoria was diminishing. By correcting the marked refractive error which was present and by decentering the lenses, vertically the diplopia was done away with. If my memory serves me there were, when I first saw the case, seven degrees of hyperphoria.

DR. R. J. MCKAY, of Wilmington, Del.—I would like to ask Dr. Callan if there were any symptoms of orbital cellulitis in his case.

DR. CALLAN.—As far as I could see there was no indication of it.

DR. GEORGE C. HARLAN, of Philadelphia.—With regard to these cases which have just been cited of blindness coming on as the result of a blow and malingering blindness, you may remember that two years ago I reported a case to this society of monocular hysterical blindness which had lasted ten years

following immediately upon a blow which the patient thought had completely destroyed vision.

There was no reason to doubt that the patient was entirely honest in his belief that the eye had been blind for ten years and he was greatly delighted when the mistake was demonstrated to him. There has been no return of the blindness since.

DR. SAMUEL D. RISLEY.—I have observed four cases of monocular atrophy of the optic nerve following blows, three received on the orbital ridge and one on the top of the head. In the last case the patient, a man in middle life, was walking through a building in course of construction when a scantling fell upon his head. He did not consider that he was seriously injured, but in a few weeks sought advise for failing vision in one eye, which proved to be due to commencing atrophy of the optic nerve which subsequently became complete.

Of the other cases, one was a boy, *aet.* 12, who came to the University Hospital, having fallen, while running, upon the end of a stick he was carrying in his hand. The blow was received on the infra-orbital right. In a few weeks there was failing sight and obvious paling of the optic nerve, which went on to complete atrophy and blindness.

Another case was that of an Irish carter, quite an old man, who was thrown from the cart striking the outer end of the left supra-orbital ridge against the curbstone. The injury was severe, and was followed by great swelling and oedema of the soft parts. When this had subsided he came to the University Hospital because of his failing vision in the left eye. He had commencing atrophy of the optic nerve which also became complete, ending in total loss of sight.

The fourth case I saw in consultation with Dr. Elmer of Davenport, Iowa, in July 1. A few weeks before a farmer had been thrown from a machine for loading hay in the field, and one of the prongs or fingers sharpened into a long cone had struck the outer angle of the left orbital ridge, glancing backwards. How deeply it had penetrated could not be determined, but he had complete secondary strophy of the optic nerve and

there were the remains of extensive hæmorrhages in the retina. In this case the iron finger probably either penetrated to the orbit or splintered the orbital walls, leading to extensive post-ocular hæmorrhage or possibly direct injury to the optic nerve.

Paper by Dr. R. A. Reeve, of Toronto: "A case of Pulsating Exophthalmus."

DR. GEORGE C. HARLAN.—I think that as ligation of the carotid is a serious operation, and not always a successful one, intermittent compression, being free from serious inconvenience, should be always given a fair trial. My own experience extends to one case only, but was very satisfactory.

The patient had very much the same symptoms which have been described in the paper. The injury was inflicted by the head being caught between the bumpers of two railway cars, and very nearly ended in death. Some months afterward the man came under my charge. After trying continuous compression by means of relays of students for twenty-four hours without material improvement. I had intermittent compression kept up from time to time upon the carotid, and afterwards the patient after returning to work was taught to keep up intermittent compression himself. He arranged an apparatus, a stick about a foot long with a padded end, by means of which he was enabled to attend to the compression very satisfactorily. He went back to his work on the train and whenever he had an opportunity he went into the baggage car, sat on a trunk and kept up the compression upon the carotid by holding the end of the stick against the artery. Some six months afterward he wrote to me that he was entirely cured and sent me later on his photograph to prove that the exophthalmus had entirely subsided.

This case was reported to the society fifteen or more years ago.

Paper by Dr. Emil Gruening, of New York: Divergent Squint and Its Operative Treatment.

DR. DAVID WEBSTER.—Does the treatment shorten the muscles on both sides?

DR. GRUENING.—No sir.

DR. R. J. MCKAY.—I wish to thank Dr. Gruening very much for this paper. I operated two years ago on a case of monocular amblyopia, the result of an operation in early childhood in England, in which there had ensued an ulceration and destruction of more or less of the sclerotic coat over the site of the operation for the convergent squint, and you could see through the conjunctiva the bluish choroid very plainly. I did a complete section of the externus of the eye. I measured it the best I could. It was about 58 degrees with prisms. The patient occasionally had diplopia that annoyed her somewhat. I stitched the eye after the section to the nose, and kept it so for from twenty-four to thirty-six hours. I apparently gained one-third, but subsequently it diverged again and I did not gain quite so much. She went to Moorfields last year, for further operation, but she was not operated upon.

DR. GRUENING.—The operation I mentioned is not applicable to this case. It is one of secondary divergence. Here the motility of the eye inwards is reduced. In cases of ordinary divergent squint, the inner edge of the cornea can be moved to the caruncle and the outer edge to the outer canthus.

DR. DAVID WEBSTER.—I merely wanted to say that I have done Dr. Gruening's operation for divergent squint three or four times, I think four times, and in all cases with satisfactory results. I divided the externus and tied the eye, both externi, and tied the eyes together across the nose, and left them in a slightly convergens position. I think it is always necessary to bear in mind the convergent position. Moreover I think if you leave them too much so you get a hyper-correction. I have not yet in any case had to excise any portion of the muscles. I wanted to give this experience because I suppose that very few members of the Society besides Dr. Gruening have had much experience with this operation.

Paper by Dr. Swan M. Burnett, of Washington: "Contribution to the Study of Heterophoria."

DR. R. J. MCKAY, of Wilmington, Del.—Dr. Burnett's paper was a very interesting one to me. I have done a good many

tenotomies and the more I do the better I like the results. I have done tenotomy on muscles the second time, and I concur with most of the views promulgated by Dr. Stevens. I am using many prisms in combination with sphero-cylinders.

DR. HENRY D. NOYES.—I think I might have written that paper of Dr. Burnett's and put my own name to it.

DR. BURNETT.—Thank you, Dr. Noyes.

DR. NOYES.—Most of the things which he describes are entirely in accord with my own experience and belief. The tests that have been spoken of are tests for distance and not for the near. Furthermore, the prisms have a value even if with limited range. Last year I was able to clearly show that they had no value in some cases and that tenotomies were preferable. But very often prisms have a value, which I think will sooner or later be found by other observers than myself.

I have no objection to the modern nomenclature in general, but I do object to one implication which they contain when we use the terms heterophoria or esophoria or exophoria; in that those terms are applied to the artificial condition as caused by producing vertical diplopia. If we are to rely upon the normality or abnormality of the muscles according to whether vertical diplopia being produced the images stand to the right or left I can assure the gentlemen present that they will fall into trouble. It is not a reliable test. It is only a test valuable up to a certain point, and, if you are to get a true idea of the right conditions, you must make the abduction and adduction test and also that for vertical diplopia, otherwise you will find great errors.

Dr. Burnett has operated on cases upon which I think no one would for a moment hesitate to operate. If I saw a case of esophoria or exophoria amounting to what he describes, I certainly believe that would come within the domain of surgery, and you can always calculate on good results. One thing more. The more I deal with these cases—and perhaps I have had more experience with them than most practitioners present—the more sure do I become that the essential element is a spasm of the muscles rather than a weakness of the muscles.

And I can account for many features in these cases upon the assumption of spasm which I cannot account for on the ground of paresis. The conditions may combine and for that reason I am certain that the temporary benefit which results from a partial tenotomy is accounted for on this hypothesis. But I still hold that a total tenotomy performed with the utmost care is better than a partial tenotomy. The reason lies in these anatomical facts, and these anatomical facts have not yet found sufficient credence among ophthalmologists, that the strength of the extrinsic muscles of the eyes depend, not only upon the strength of the muscles, but also upon the ocular fascia. I would advise the members present to consult the work by Motaïs, a volume recently issued, a big thick book. There are chapters in it which show you how variable is this structure, and how greatly it influences the action of the muscles. For that reason a tenotomy will be found in certain cases to have no effect, in other cases it will have a good deal of effect, but you must always reckon with the extent and density of fibrous tissue; it depends also upon whether the sub-conjunctival tissue is disturbed. It is a question of technique.

These are some of the suggestions that I wish to offer, and I am glad Dr. Burnett is coming out upon the plane where I find myself.

DR. SAMUEL THEOBOLD.—I wish to say a word with regard to Dr. Burnett's having performed only a partial tenotomy in a case in which he mentions the presence of eight degrees of esophoria. My own experience would have warranted me in similar circumstances in doing a complete tenotomy of the internal rectus, with the expectation that I would eventually have to do a free tenotomy of the internus of the other eye. I have in mind a case. I do not remember the exact degree of esophoria, but I think it was not more than eight or possibly ten degrees at twenty feet, in which I did just such a tenotomy of the internal rectus of both eyes, first upon one and later on the other, and there still is a marked degree of esophoria left. The performance of partial tenotomy for esophoria amounting

to anything like eight degrees would in my experience be an ineffectual measure.

I would ask Dr. Burnett if I understand him correctly when he said that he gave prisms for one eye base in, and for the other base out.

DR. BURNETT.—No, sir.

DR. B. ALEXANDER RANDALL, of Philadelphia.—As to the use of prisms I would like to say one word for the bridge that has thus far generally carried me over, and I have to thank Dr. Risley for the pair of prisms he gave me several years ago, thereby very greatly increasing my ability to use my eyes and relieving my muscular asthenopia.

I would like to ask those who do much in correcting small degrees of heterophoria whether there is any real value in testing at the moment of operation the conditions of the heterophoria, which remains after the snipping of the whole or a part of the tendon has been accomplished, because I have seen results so nugatory as to make me doubt very much whether such tests carried on at the moment of traumatism had any value. It seemed that if a man did his tenotomy in accordance with what he had previously found, he did as much division as he judged right with approximate accuracy but that, if he undertook to correct that operation or greatly reduce it in accordance with what he then found, he was walking on a quicksand.

DR. GRADLE, of Chicago.—The occurrence of heterophoria has been so much emphasized by some, and, on the other hand, denied by so many others, that I have thought it best to test for its existence by other means than the prism test. I have devised a method for the purpose which I demonstrated at the International Medical Congress last year, and which is comparable to the haploscopic method of physiologists. A partition held projecting from the nose divides the field of vision of one eye from that of the other so that the position of lines in the separate field of vision of each eye may be compared at either a large distance or at a short range. The patient reads off directly the degrees which the eye deviates,

if any, from its proper position. In this method no optic device like prisms is used, thus avoiding accidental sources of error. On examining fifty normal and pretty nearly two hundred asthenopic sets of eyes, I found that minor degrees of latent squint are exceedingly common, but without any morbid significance whatever, if they do not exceed a certain latitude. The numerical indications furnished by this method are very constant at different examinations, and generally a little less than the deviations found by the prism test. Moreover, the deviations by my method are expressed in angular degrees. Deviations in a vertical direction I found to be the same for distance or short range. Horizontal insufficiency, however, varies with the distance at which the object is held. I have learned that vertical heterophoria of less than one or possibly one and a half degrees is a very frequent deviation which does not ordinarily lead to annoyance. Similarly an exophoria of less than two or three degrees for the distance I should consider harmless, while for short range it may account to six or eight degrees without causing any inconvenience. Latent deviations of sufficient intensity to cause either asthenopic or nervous symptoms have come very rarely indeed under my observation. I cannot but regard them as an uncommon occurrence, although they do not exist. But, if of sufficient intensity to cause morbid consequences, the squint is apt to appear manifest at times as well, and is extremely easy to recognize by means of my method as well as by any other mode of examination. Prisms I have not found satisfactory for the correction of heterophoria. A fact previously noticed by Dr. Stevens is that the correction by means of a prism although complete to-day, may appear insufficient to-morrow; in otherwords, that under a correcting prism the deviation may continue to increase in extent.

Dr. Noyes' view that spasm is the cause of these deviations would seem to be supported by this observation. My surgical experience in the correction has been limited to very few tenotomies, and those only incomplete and nerve partial.

DR. MYLES STANDISH, of Boston.—This subject is one to

which I have paid a great deal of attention for the last two years since reading a paper before this Society with regard to this particular matter. I must say that my conclusions are absolutely those of Dr. Burnett; that there is a very considerable proportion of cases of ametropia who have no insufficiencies of the muscle; that the greater quantity of those cases are cured by correcting the error of refraction, and that in the few that are left it is advisable to do a partial tenotomy. Two years ago I reported to this Society my five cases. I have done quite a number since. Of these five cases all but one had been through the hands of many members of this Society; they had been for seven or eight years incapacitated for their work; had been in the hands of neurologists; had not been improved; had been operated upon by me for partial tenotomies, and were treated by suggestion as several members of this Society intimated at that time. Seeing the title of this paper on the bulletin before I came to Washington, I took the trouble to write those cases to find how they had been doing since, and I am happy to tell the members of the Society that the suggestion made to them has lasted ever since; that these are well, all of them about their avocations, all marvels to their friends and all that sort of thing.

I think that there are a number of things to be considered with regard to these partial tenotomies. In the first place we do not want to do a partial tenotomy because we find insufficiency; in the next place we must remember that our insufficiency may be a spasm as Dr. Noyes suggests, or it may not be as Dr. Noyes did not suggest. Now, if you take many cases of insufficiency and examine them the first time they come into your office, you find that there is a large amount of insufficiency. If you undertake to correct their error of refraction by atropine and then examine them, you find a different sort of thing altogether. You now find very much less insufficiency and insufficiency in the opposite direction. Therefore, haste in this sort of thing is very disastrous.

Now it seems to me that Dr. Noyes is perfectly correct in many of his statements upon this subject.

Dr. Maddox, of Edinburgh, suggested the glass rod for insufficiency in connection with the same thing as that suggested by Dr. Burnett. The glass rod makes no diplopia, horizontal or vertical, but shows insufficiency without any prism imposed. It is superior to anything we have had up to the present time. I think that the measurement of the amount overcome by prisms, the amount or the power to be overcome by prisms is utterly fallacious. I said two years ago I was not inclined to place much dependence upon it. Now I say I place no dependence upon it whatever.

DR. P. A. CALLAN, of New York.—I want to make a few remarks in this connection. I speak with special reference to the externi. In my hands partial tenotomies two weeks after the operation have no results whatever. In simple tenotomy of the muscle where I merely separate the tendon at its point of attachment to the eyeball without any further dissection of the fascia, I will average about two degrees for twenty feet as a result.

DR. J. E. COLBURN, of Chicago.—I have the honor of being an accredited visitor to the Society, and with your permission I would like to make a few suggestions with regard to this matter. In my opinion, the unsatisfactory results registered and reported during the first years that Dr. Stevens' work was on trial relative to the value of the graduated tenotomy as legitimate operative procedures, were due to the failure of operators to recognize the existence of these small bands of attachment which have been mentioned by Dr. Noyes as binding the tendons to the ocular walls, and also extending anteriorly to the capsule of Tenon and the conjunctiva. These, unless cut, will also prevent the full result of an operation for a complete tenotomy. To prevent a failure in such operations, I use a divulser thoroughly separating such bands. In the higher degrees of heterophoria I have modified the operation for graduated tenotomy, *i. e.*, proceeding as in the graduated tenotomy. After cutting through the tendon, pass the needles of a double-arm suture through the cut-end of the tendon back and out to the conjunctiva at the distance the operator deems it advisable to displace the tendon, then terminate the section of the tendon as in complete tenot-

omy. The suture is then tied. The wound through the conjunctiva should be parallel to the border of the tendon. I so make this operation for manifest squint. The only modification is that of passing the needles further back through the conjunctiva. In following this method of procedure I have found it advisable to make advancement of the tendon in fewer cases, and there is also less danger of displacing the tendon thereby producing hyperphoria as the result of such malposition.

DR. J. A. LIPPINCOTT, of Pittsburgh.—In testing for muscular insufficiency, I think it unwise to rely exclusively upon any single method. I have seen cases in which repeated examinations with the rod test revealed no abnormality, but in which either exophoria or esophoria was actually present, as demonstrated by the vertical diplopia test, and also by the subsequent history. I am satisfied that the abduction tests have decided value, especially if we employ them to estimate not only the resistance to double images—the staying power—but also the power of fusion of such images after diplopia has been induced. This measurement can be made in the following way:

In trying the power of the internal recti, for example, the power of the rotary prism is progressively increased in the usual manner until double images are evoked. Then, without removing the apparatus from the eye, the power of the prism is gradually lessened until fusion of the images takes place. A patient with decided exophoria may show a resistance to double images equal to, say 24° , but it will be found, as a rule, in such a case that fusion does not take place until the prism is reduced to a strength of 8° or 10° or even much less. This method of using the rotary prism has been found in my experience to considerably enhance its value.

DR. R. A. REEVE, of Toronto.—Dr. Lippincott has fore stalled me in his statement of his procedure. I have done this same thing in many cases, and I believe that it is a valuable adjunct in the using of prisms. I am glad to see the evident tendency to conservatism in the discussion of the paper read by Dr. Knapp, and the conservatism which was indicated by Dr. Knapp's paper. I am sure that we should take into consideration before passing to operative work the etiological factor in these cases of want of co-ordination. I am sure

many of them are temporary, depending upon rheumatic conditions of some senile muscle, and under proper treatment they disappear—to recur again perhaps. Then again many of them grow out of want of similar conditions in the eyeballs; that is to say, a case of ametropia with astigmatism of varying degrees in the two not corrected is very apt to set up a want of similar movement in both eyeballs, which to-day may be esophoric and to-morrow hyperphoric. I think it is necessary to break up this possibly temporary condition by treatment or paralysis of the accommodation and all use of the eyes at a near point. Again and again my record books shows disappearance of slight degrees of esophoria and very much more frequently the disappearance of hyperphoria under the prolonged use of mydriatics. I am glad to see a tendency to conservatism, as I said before, in treatment of these cases of hyperphoria, so-called.

DR. EMIL GRUENING, of New York.—I rise only to say that the operation suggested by me is not one for periodic divergence. It is for absolute and constant divergence. For a divergence produced by an excessive tenotomy of the internus, advancement of the internus is necessary.

DR. SAMUEL J. JONES, of Chicago.—It seems to me that the conservative feeling pointed out by Dr. Reeve may be kept up in other directions. As specialists we are much too prone to proceed to our local treatment regardless of the constitutional condition, whilst not entirely disregardful of it perhaps, paying smaller attention to it than we should. I think we shall be able to be still more conservative by following a proper constitutional treatment and supplementing that by electricity, improving the nutrition of the parts, giving more tone, less spasm, and in that way obviating many operations that are now performed and thus diminishing the use or the necessity of prisms. I speak somewhat from personal experience in these matters. I believe the theory to be right. In my own practice, it has been satisfactory.

I want to emphasize the fact that we are apt to get into the habit of disregarding the conditions which lead to these consequences instead of going back to the starting point, removing those conditions to a great extent, and thus removing a part if not all of the consequences that come from them.

[TO BE CONTINUED].

CORRESPONDENCE.

MACON, GA, Nov. 4, 1891.

EDITOR AMERICAN JOURNAL OF OPHTHALMOLOGY: Referring again to the subject of homatropine, concerning which I had somewhat to say in the September number of your Journal, if you will allow me space, I will give you the results of the trial of homatropine in four more cases of refraction work. Of course the record of four cases no more settles the question as to the relative merits of atropine and homatropine than does one, or even four, swallows make a summer.

Recently, Dr. Casey A. Wood, of Chicago, noticing my remarks in the last journal, sent me some of the gelatine disks to which he called the attention of the profession in the June number of the AMERICAN JOURNAL. These disks each contain $\frac{1}{50}$ gr. homatropine and $\frac{1}{50}$ gr. cocaine.

(Messrs. Wyeth, of Philadelphia, had previously sent me some to try, but having lost faith in homatropine, I did not use them.) However, at Dr. Wood's suggestion, I resolved to use the ones he sent me, and give them a careful and fair test. There was enough for about four cases. In two of the cases patients were young lady school teachers, æt. 24 and 27. One of them proved to be hyperopic, and the other had a compound hyperopic astigmatism. The accommodation was fully paralyzed, and the ametropia satisfactorily corrected by inserting one disk in each eye, and repeating it in 15 or 20 minutes, as recommended by Dr. Wood. Neither of the patients could read 16 of Jaeger at 15 inches, and they both had their ametropia successfully corrected within 90 minutes from the time the first disks were inserted.

The next case I tried them with was a lady, æt. 37. She had some pretty positive symptoms of eye strain, and I used only one disk in each eye. I tested her for close reading in 60 minutes, and found that she could read Jaeger 16 and 14, at 15 inches, fairly well, and in 90 minutes she could easily read Jaeger 14 at 15 inches. I afterward found out that this lady was emmetropic.

Case No. 4 was a boy, æt. 13. He had considerable symptoms of eye strain, yet by no means so bad as to have what I still denominate "ciliary spasm." After using a disk in each eye and repeating it in 15 minutes, in 60 minutes I found that he could read some of Jaeger No. 14 at 15 inches, and could readily read No. 16; at 90 and 120 minutes from the first he could still do this. Under the mydriatic his vision was:

$R. =^{20}/_{XL} +, L. =^{20}/_{L+}$. R. with $+50 \supset +25$ or 50 cyl. ax. $90 =^{20}/_{XX}$. L. with $+1 =^{20}/_{XX} -$.

I then dropped in a 4 gr. sol. of atropine, and had him to repeat it at bedtime, and again early next morning, when I again tested him and found that his vision was:

$R. =^{20}/_{LXX}, L. =^{20}/_{LXX}$; R. with $+1 D. =^{20}/_{XV}$; L. with $+1.50 =^{20}/_{XV}$.

Under the atropine he could not possibly read any of Jaeger at 15 inches; nor was there anything like the difficulty experienced in finding the proper glass, which I so frequently encounter when I use homatropine. I have, in a very few cases, found that patients (not myopes) could read 14 and sometimes 12 of Jaeger, while as fully under atropine (a 4 gr. sol.) as I could get them. I have quite frequently had them do so while under homatropine. Will some one please explain this phenomenon?

Is it because some persons have a better perception of form for small objects than others do? I certainly think that Dr. Wood's idea that the homatropine is better absorbed and less wasted in the gelatine disk form than by an aqueous or oily solution is correct, and I thoroughly believe that he has effected a very great improvement in the use of homatropine. The great question that still remains (to my mind) unsettled is: Will homatropine, or homatropine and cocaine as certainly paralyze the accommodation as a 4 gr. solution of atropine will? It has failed me so frequently during a 3 years' trial of it that I have little faith in it as a *reliable* mydriatic in refraction work. For the present I shall not write more on the subject, but I hope by writing this I will draw out the opinions of those of wider experience than my own.

Finally, will some one inform me if we have any reliable test of complete paralysis of the accommodation?

Yours very truly,

R. O. COTTER.

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ORIGINAL ARTICLES.

OPERATION FOR SECONDARY CATARACT FOLLOWED BY IRIDO-CYCLITIS AND CONSECUTIVE GLAUCOMA.

BY THOMAS R. POOLEY, M.D., NEW YORK,

Surgeon to the New Amsterdam Eye and Ear Hospital; Professor of Ophthalmology in the New York Polyclinic.

In a large percentage of cases of cataract extraction, whether by Graefe's method or the one now more in vogue, simple extraction, the acuteness of vision, in successful cases, does not come up to the expectation of either the patient or the operator. This is due to the presence of capsular remnants which greatly interfere with perfect vision, and renders the operation for discussion of the capsular membrane necessary. While serious reaction after carefully performed operations of this kind is infrequent, nevertheless it does occur, and that the character of the reactive process, thus awakened, may be sufficient to menace the eye, is sufficiently well illustrated by the following case:

July 8, 1891, I made an operation for the extraction of cat-

aract upon the right eye of Mrs. M., at. 60, by Graefe's method. The cataract was not entirely matured, some of the anterior cortical fibres being still semi-transparent. The extraction was without the slightest accident, and the cortical remnants left behind were carefully removed. Cocaine was used in the operation. The healing was without any pain or reaction of any kind, and the patient was discharged from the hospital two weeks after the operation with $V. = 15/_{LXX}$ with +15 D., and she could read Jaeger No. VI with +18 D. The pupillary area was seen upon oblique illumination to be almost entirely occupied with a thin capsular membrane, and the probable necessity for a secondary operation explained to her.

September 15, she returned for examination, and the secondary membrane had still more developed. $V. = 20/_{c}$ only, and Jaeger VI. Discussion was proposed again, but she wanted to wait for settled cool weather, and did not return for the operation until October 7, when the operation for discission was made.

The operation done was the one recommended by Knapp (see *Archives of Ophthalmology*, Vol. VIII, p. 212), made with his discission knife No. 3; and when completed showed a central opening in the capsule which gave a nice black pupil. Cutting the capsule was, however, unusually difficult on account of its toughness, and a good deal of traction was made in accomplishing it. In withdrawing the knife, with the escape of the aqueous, there was a slight escape of a thin fluid vitreous as well. A drop of atropine was instilled, both eyes bandaged and the patient put to bed. The patient experienced very severe pain during the night, which began almost immediately after the operation and increased in severity.

An inspection of the eye was made the following morning. There was considerable swelling of the lids, circum-corneal injection, haziness of the contents of the anterior chamber, and some swelling of the cataractous membrane, but the most alarming feature was the increased tension, which was fully equal to T+1; she could count fingers, but the field was some-

what restricted inward and upward. A drop of a $1/4\%$ solution of eserine was put in the eye, to be repeated as required. There was at this time no pain on pressure over the ciliary region. The character of the pain was of the typical glaucomatous type. Under this treatment there was a subsidence of the pain during the day, but it returned in the night with almost equal severity, and in the morning the condition of the eye was, if possible, still more threatening. Leeches were now applied, and the instillations of eserine made more frequently. The pupil was only moderately contracted by the eserine. The necessity for the relief of the increased tension was such as to make an operation, either another iridectomy downward, or sclerotomy seem imminent, but inasmuch as there was a good sized coloboma upward, and neither vision nor restriction of the field was worse, I determined to wait. A slightly stronger solution of eserine was used every two to three hours.

The following morning, October 9, the patient had spent a good night, comparatively free from pain, slept well, and the eye had very much improved, although there was still some increased tension and marked circumcorneal injection. Without going into tedious detail as to the progress of the case, it may be thus summed up:

There was a gradual improvement with, at times, marked exacerbations of the glaucomatous attacks, until October 17. These attacks of increased tension were always more pronounced when the use of eserine was omitted, and when atropine was once used to break up a slight synechia, which seemed to be caused by it. As the distinctive character of the glaucoma subsided, the evidence of cyclitis became more apparent by pain on pressure over the ciliary region, about 15° to the inner side of the vertical meridian. In two weeks after the operation the patient was discharged with a prescription for sulphate of eserine which she was told to use, if necessary. The eye was then nearly white, all increase of tension gone, although she had not used eserine for several days; there was slight pain on pressure over the globe, but no restriction of the field.

October 21, she returned to show her eye, with the statement that during the week she had been home there had been no return of pain, and that she had not had to use the drops.

November 29, I tested her vision, and found that with +15 D. V. =²⁰/_{XL}, and with +18 D. she could read No. 1¹/₂. There was a beautiful, centrally placed opening in the capsule, and a clear black pupil. Knapp says: "should vitreous escape (*loc. cit.*), then some step of the operation, or the proportions of the instrument, are faulty, and the operation may be followed by unusual irritable reaction." The truth of this remark is evidenced by the very unpleasant experience of this case. I mentioned immediately upon the completion of the operation that I feared we should have reaction—which was, no doubt, due to the complication in the operation, which I believe to have been due in part to the difficulty in cutting the membrane, and in part to the faulty character of the instrument, since I usually accomplish the operation without emptying the anterior chamber, and with only slight escape of aqueous. In most of the cases I have operated on there has been but very little reaction, and it is only necessary to keep the patient in the hospital for four or five days.

This is only the second case in which I have had any considerable reaction, although I do not hesitate to make the operation of discussion in all cases where the sharpness of vision is considerably reduced by the existence of capsular membrane. For all this, it is subjecting the patient to an additional ordeal, and I should hail with pleasure any safe procedure which would do away with the necessity for a secondary operation.

IMPROVED REVERSIBLE SPECTACLES.

BY E. OLIVER BELT, M.D., WASHINGTON, D.C.

Persons who are near-sighted or far-sighted frequently require two pairs of spectacles, one pair for distance, and another pair for near work. Such patients complain of the bother of carrying two pairs of spectacles, and the oculist or optician is called upon to devise some method by which one pair of spectacles can be made to serve both purposes. To meet this demand the Franklin or bi-focal lenses have been made. They consist of lenses so ground that the upper part of the lens suits for distant vision, and the lower part for reading or near work.

The greatest objection to such lenses are the impossibility of getting them properly centered, and the great contraction of the field of vision necessitated by putting two lenses in one eye-piece. However, for persons who can see with both eyes the above arrangement seems to be the best that can be made.

But we come across quite a number of people who are blind in one eye from one cause or another, and whose seeing eye requires a lens for distance, and a different one for near work. In such patients as these the reversible spectacles are used.

Those in general use consist of the ordinary spectacle frames with straight temples and what is called the X bridge. The lens for distance is put in one eye-piece, and the reading lens in the other, so if one is using his reading lens, and wishes to change for the other, he only has to turn the frames over, and that brings the lens for distance in front of the eye.

The great objection to this form of reversible spectacles is that the X bridge does not fit the nose. If the patient has a high nose, in reading he will look under his spectacles. If he

has a low nose, they may be all right for reading, but he will look over his spectacles when he wishes to look at a distance.

These objections are obviated by the spectacles which I have had made, and the advantages claimed for them are that the bridge may be adjusted to suit any nose, and the lenses properly centered in front of the eye. The construction of these spectacles is simple. Any bridge that will fit the nose will do, provided it is placed in the plane corresponding with the eye piece. Hooked temples are used to go behind the ears instead of the straight temple. These are attached to the eye piece by a hinge joint, *but the shoulders are filed off so the temples can be reversed*, and the spectacles turned *around*, instead of *over*, thus enabling us to have the bridge made to suit the nose, and the lens properly adjusted in front of the eye, as above claimed.

Such a pair of spectacles I found in the hands of a patient, about four years ago. Seeing their value, I had a pair made, and called Dr. Chisolm's attention to them. He frequently prescribes them for cataract patients who have only one eye operated upon.

I do not think the attention of the profession has been called to them before.

CORRESPONDENCE.

CHICAGO, ILL., NOVEMBER 21, 1891.

EDITOR AMERICAN JOURNAL OF OPHTHALMOLOGY.—Dr. Cotter's experience as to the relative merits of atropine and homatropine for the production of mydriasis as given in the last number of your JOURNAL is but a duplicate of the experience of every physician who has compared the effects of the drugs. It is difficult to explain the continued confidence of some leading eye specialists in the power of homatropine to completely relax the accommodation, when all the experiments of reliable observers demonstrate the contrary; but it can be stated positively that many cases of refractive errors corrected under homatropine have to be corrected under atropine afterward, and the later correction is nearly always made by a different oculist.

After quite an exhaustive series of experiments with homatropine in various strengths and in various combinations, including the discs recommended by Dr. Wool, I am perfectly satisfied that the drug cannot be depended on for producing the degree of relaxation of the accommodation necessary to insure satisfactory correction of all refractive errors.

It must be admitted that many, perhaps most, of the patients suffering from refractive errors are satisfied with and grateful for even very imperfect corrections of their errors. What oculist is there who has not seen satisfactory results from the prescription of glasses correcting half, a third, or even less of the total error, and when these facts are known is it to be wondered at that, when homatropine brings out a part of the error, successful prescribing after its use may be the result in a large number of cases. So long as the whole refractive error, as determined by the use of mydriatics, is not cor-

rected (and oculists making a practice of giving full correction are the exception) by the leading lights of the specialty, can any one be criticized for not determining the total error?

It does not seem strange that when such wide variations in "allowance for tone of the ciliary muscle" and "rule of thumb" reductions from the total error found when atropine is used, are found to be the practice of oculists throughout the world, that different opinions regarding the necessity for learning the total error should obtain, and it is to call Dr. Cotter's attention to these self-evident answers to his query, rather than because of membership in the class or men that he designates as "wise" that I rush into print.

W. S. FOWLER, M.D.

WASHINGTON, D. C., Oct. 28, 1891.

EDITOR AMERICAN JOURNAL OPHTHALMOLOGY: I'm not a doctor, M.D., D.D., or D.D.S., but I'm a newspaper man, which includes all degrees. I come to you with a question. Not long ago I happened into an oculist's office, where he was projecting with cold pig's eyes for cataract. I asked him to let me squeeze out a few, and he did it. I fancy it was a good thing for the pig's comfort that he was dead, but I removed the cataract, just the same. Then the doctor told me how the eye restored itself, and how a glass supplied the place of the lost lens. I asked him why oculists, instead of using a glass, did not slip into the place of the clouded lens removed from the human eye a healthy clear lens from a pig's eye, and he said he did not know, that it had never been tried, as far as he knew. He is yet quite new in the profession, and, of course, his knowledge can not be so extensive as yours. What I want to know from you is, is such an operation possible, with any degree of hope as to ultimate success, and has it ever been tried? If not, why not?

With the hope of enlightenment on this subject in the JOURNAL,

I am yours, sincerely,

W. J. LAMPTON.

SOCIETY PROCEEDINGS.

REPORT OF THE DISCUSSIONS OF THE 24TH
ANNUAL MEETING OF THE AMERICAN
OPHTHALMOLOGICAL SOCIETY, HELD
AT WASHINGTON, D. C., SEPT.
23 AND 24, 1891.

[CONCLUDED]

Paper by Dr. George C. Harlan, of Philadelphia: "A Modification of Dieffenbach's Operation for Restoration of the Lower Eyelid."

Paper by Dr. Samuel Theobald, of Baltimore: "A Case of Successful Skin-Grafting Upon the Eyelid by Thiersch's Method.

Discussion on the above papers was, on motion, postponed until Thursday morning's session, and the Society then adjourned.

THURSDAY MORNING, SEPTEMBER 24, 1891.

The discussion of the papers of Dr. George C. Harlan and Dr. Samuel Theobald, read at the previous session of the Society, were proceeded with:

DR. HENRY D. NOYES, of New York.—I will not take up the attention of the Society for more than a moment. I only want to say in reference to Dr. Harlan's proceeding that it is an extremely ingenious and satisfactory method of treating certain very difficult cases, and I would call attention to the fact that the same proceeding has been performed by myself; when I

have been obliged to slide a large flap into a lid and have left a secondary, I have used a portion of hairy scalp to slide into position. This does not become objectionable in such cases, and it answers precisely the same purpose as Dr. Harlan's method.

In regard to the second paper which was read by Dr. Theobald, I merely want to give my experience in a similar class of cases. I have had under my notice for the last two years a man whose face was shockingly burned and whose tissues were cicatrized to a terrible extent, and for that man I first performed Wolf's operation as there was no tissue in the vicinity, and took the structure from the front of the abdomen. That flap introduced into the lid shrunk so much that the deformity was reproduced in comparatively a short time, and it practically did almost no good.

Then after the lapse of several months I did Thiersch's operation, being encouraged in this by what I saw at the Johns Hopkins Hospital last year, and believing that the introduction of the flap including only the epidermis would be less inclined to shrinkage. This has done better than Wolf's operation. But even that has undergone shrinkage, which was so considerable that it continued to leave ectropium. A third operation was performed in which I had to use the adjacent cicatricial skin, and that skin in the lapse of one and one-half years had acquired so much thickness that I could turn the flap from the forehead down, and by this operation I have succeeded in restoring considerable breadth to the upper lid. This was supplemented by the uniting together of the outer halves of both upper and lower lids, leaving the eye covered during this period.

The Wolf operation was a failure; the Thiersch operation a partial success. It was supplemented afterwards by a flap of cicatricial skin.

Paper by Dr. G. E. de Schweinitz, of Philadelphia: "A Case of Elephantiasis of the Eyelid."

Paper by Dr. F. M. Wilson, of Bridgeport, Conn.: "The Use of Vaseline in Gonorrhœal Conjunctivitis."

DR. SAMUEL THEOBALD.—Was the vaseline melted before its insertion?

DR. WILSON.—No sir. Put in cold and it is afterwards melted by the warmth of the skin.

DR. DAVID WEBSTER, of New York.—Just one word as to vaseline and the method of applying it. Since the time two or three years ago when the Doctor first proposed this method of treatment and told us about the use of it, I have been applying vaseline in these cases. I find the best thing to do is to get the pure white vaseline, that which comes in the artists' tubes. You unscrew the cap, and inset the mouth of the tube under the upper lid, not touching the cornea, and see that you squeeze the vaseline well into the cul-de-sac. I would like to know if that is the way Dr. Wilson applies it?

DR. WILSON.—I think the most important point is to get the vaseline after it melts clear to the bottom of the cul-de-sac. I use the same vaseline spoken of by Dr. Webster, and apply it between the lids, and rely upon manipulation afterwards to extend it in the required directions. I keep up this manipulation until I am sure that the vaseline has become quite liquid. I think that is a very important thing.

DR. R. J. MCKAY, of Wilmington, Del.—I have had recently three cases of gonorrhœa in which I started with vaseline and boracic acid, one of the latter and two of the white vaseline, and for a while it seemed to do very well. One was a very bad case from Wills Eye Hospital, Philadelphia, in which there was loss of one eye. When the patient came to me both eyes were filled with purulent matter; this case was not one of gonorrhœa. Yet complete destruction was going on. I tried the peroxide of hydrogen one part to two parts of a 1:10,000 of bichloride, and after cleaning the eye by injecting it with the largest nozzle of the lachrymal syringe well up into the cul-de-sac, I found that it seemed to saponify and get rid of the pus very fast, and thus I got rid of a large amount of the "running" in a most surprising manner to me; and at the present time I hope to go back to find that old man a good deal better. I do not know whether I shall save the remain-

ing eye or not, but I believe the peroxide of hydrogen injection was a most valuable thing. I first tried it upon the eye that had been lost, and found so large a diminution of the purulent discharge that I tried it upon the other one, with equally satisfactory results.

DR. HENRY D. NOYES.—I am glad to be able to corroborate the remarks that have been made as to the advantages occurring from the use of vaseline. I think Dr. Wilson has stated the matter judiciously. It is not a curative agent, but it adds greatly to keeping the eye clean and protecting the cornea. I was delighted as well as surprised to find that a case in which I had used it last—not a severe case—but one of the patient's eyes had been lost—how thoroughly it protected the cornea, which kept glistening and bright. The vaseline has to be thrust up by a small spatula and of course used in connection with the other treatment, the cold bichloride solution, the nitrate of silver and all other methods that may be proper.

In regard to peroxide of hydrogen I would say that it was tried at the Eye and Ear Infirmary several years ago when it was going the rounds, and I have this much to say regarding it: It does have a wonderful power of controlling the secretion. It will remove the purulent discharge quicker than anything I have found; but it leaves œdema and the destructive process going on as rapidly, if you rely upon that alone, as if you did not use it. It is wonderful in its control over the secretions, but it does not help you out, and I do not think we cure any more cases by this than by ordinary treatment. Of course, we were not then using vaseline, but I shall never hereafter treat these cases without vaseline and keeping the eye continually smeared with it.

DR. ALBERT G. HEYL, of Philadelphia.—I would like to add a note from my own experience which, though recorded elsewhere, may be of use to the members of this Society. I treat these cases with an ointment of lanoline and cubebs which is applied to the skin surface of the upper lid, is absorbed and acts very happily in these adult cases. I use an ointment of

ten grains of oleo-resin of cubeb to the drachm, stronger than that makes a very painful application.

This disease is a very destructive one and I thought that this hint might be of use to the members of the Society in some of their cases.

DR. F. B. LORING, of Washington.—In connection with this case there is one thing that I have used with great success, and that is an application of menthol and vaseline for the breaking up of furuncular processes. I take two drachms of menthol and dissolve in liquid vaseline, apply that and the pain almost entirely disappears, and resolution takes place very rapidly. These little furuncles are apt to come in a series of three. I have never seen recurrences after this method of treatment. It produces some little inflammation of the conjunctiva if it gets in the eye, but it is very much slighter than you would naturally think from the strength of the application. I have used it repeatedly on the eyelids and in the meatus of the ear, and I have found it to be superior to anything else I have tried.

DR. R. A. REEVE, of Toronto.—I would suggest the dipping of a point that is slightly flattened in gelatol emulsion, and apply that to the bottom of the cul-de-sac.

DR. W. V. MARMION, of Washington.—I have heard nothing of the division of the outer canthus during this discussion of vaseline in the treatment of gonorrhœal ophthalmia. It has always seemed to me that pressure was more instrumental in destroying the cornea than purulent discharge, and I should dislike to trust a case of mine to the nitrate of silver, vaseline or other agent without first getting rid of the pressure of the upper lid. It seems that the pressure causes tumefaction of the cornea and glands, everting the lid, and there is nothing like the safety assured by the operation.

DR. F. M. WILSON, of Bridgeport, Conn.—Just one word in closing. I think that all instruments of any kind put inside of the lid to get at the bottom of the cul-de-sac are apt to do harm unless kept in the hands of the surgeon himself. If we treat these cases we are obliged to leave them in the hands of

hospital nurses and inexperienced persons in private houses; and in cases where the lids can be separated at all, if you get the vaseline between the lids, and will work them backward and forward long enough it will melt and penetrate to the bottom of the cul-de-sac, and will not have to be pushed back. I think that the person who takes care of the eye and removes the pus is the most important factor in all cases. Vaseline has no power as an antiseptic. But if introduced without mechanical violence, it is a valuable auxiliary.

Paper by Dr. H. Knapp, of New York: "Demonstration of a Roller Forceps for Pressing Out Trachomatous Granulations According to the Mangle Principle."

DR. DAVID WEBSTER.—I have used this method of treatment of follicular trachoma and granular lids in quite a number of cases. I have not counted them up, but within a year or two I have been operating in suitable cases and always had the best results. I have always used Noyes' forceps for that purpose. It requires two pairs, one to fix the lid, the other to do the squeezing and scraping. After I had operated on quite a number of cases I learned that it was a rule with a number of my most eminent colleagues in New York City to apply the sulphate of copper freely after the operation, first wiping away the blood, then applying the sulphate. So I tried that in one eye, and did not do it in the other eye of the same patient. I thought I would compare the result. The result was that the eye that had the sulphate of copper applied to it became very much more inflamed, there was a good deal of inflammatory reaction, and it was much longer in recovering than the other eye. The result was absolutely the same. I find that by this method of treatment we can cure cases of follicular trachoma in a couple of weeks, or *nearly* cure them in that time, where it would take perhaps two years to cure them by any other method. I think it is one of the greatest discoveries of modern ophthalmology.

DR. MYLES STANDISH, of Boston.—Since Prince showed me these forceps I have used them in my clinics frequently, and with most satisfactory and surprising results. Patients come

in, not able to open the eyes, you squeeze out the contents of almost all the granulations, and the next day they come down stairs with the eyes wide open and say they feel fine. The results have been very satisfactory to my mind. It is true that with Prince's forceps there is a good deal of bleeding and apparent tearing of the conjunctiva. I think, however, this is more apparent than real, as the next day the conjunctiva looks quite entire. It would seem as if each follicle was readily broken up by Prince's forceps and evacuated of its contents. I have always done it under cocaine, however. If Dr. Knapp's roller forceps will do the same work with less laceration, it seems to me they are to be preferred, but that the treatment is correct, and that it shortens up the length of stay in the hospital of all cases of acute granular lids by at least three months, I am fully certain.

DR. HENRY D. NOVES.—I have made use of these forceps as a good mechanical arrangement for performing the work, and I am willing to grant that a certain amount of laceration and reaction takes place which is unpleasant. In some cases I have had to resort to the use of ice water continually for two days; but in most cases the œdematosus condition subsides before that time. Having all the squeezing power at one side of the handle, you are able to get into the outer and inner angle better than you can by any other instrument, and you can pick up small portions of tissue and handle it with the forceps I have made use of better than by any other method. I think the rollers Dr. Knapp has described would do best in those cases where you want to squeeze out the follicles on the tarsus. There you may be able to exert an amount of pressure greater than you could secure with other instruments.

You must always have two pairs of forceps, one to fix the tissues and the other to squeeze out.

Now, as regards the cases to which this treatment is applicable. Let me say first: The cases to which this practice eminently applies are those of follicular trachoma in which there is no opacity or vascularity of the cornea. There is a slight amount of secretion and discomfort; the patient is not appar-

ently aware of it; he simply knows there is a purulent discharge. Galezowsky has done excision of the cul-de-sac in this class of cases, upon which I have also operated in this manner for many years. I have removed the cul-de-sac of the upper and lower lid, and no shrinking has taken place, owing to the prudence with which it is done; I have got rid of this disease by this method, in cases which would otherwise have occupied from six months to two years for cure. This is not a dangerous disease; it never produced vascularity of the cornea.

But take the mixed cases of trachoma, and this method is not so successful. It helps the cases, but you have still to go on with the ordinary methods of treatment, with the nitrate of silver, astringents, and whatever else should be applied.

I wish to add but one word more. I have done this operation to a very large extent during many years. I have not kept any statistics, and have not recorded my cases, and have only been giving you impressions derived from the growth of experience. The thing can recur. Dr. Knapp has not seen it recur. I know at least two cases where after six months I have been obliged to resort to the squeezing again. Furthermore, if you have treated your case with some severity in the process of squeezing, you will get a grayish film of plastic exudation of the conjunctiva that may last for a day or two; but you will find this disappears. This never results in cicatrization. This process has never given rise to any shrinking of lids afterward, and it greatly shortens the period of treatment.

But for papillary hypertrophy which may be consecutive, or primary, the squeezing does much less good. That has to be treated with sulphate of copper and nitrate of silver for a certain number of weeks. But I can assure you that extrusion of the follicles is a great boon.

DR. EMIL GRUENING, of New York.—I have made use of another kind of forceps for the same purpose of squeezing out granulations. The forceps are somewhat similar to those of Dr. Noyes, but differ from his in this, that but one is required.

I find that relapses occur when disinfection of the lids is not

resorted to. After expressing the granulations I use sulphate of copper in substance. In a case of follicular trachoma in a child, where the lower lids only were affected, I used this forceps without disinfecting the lid, and two days later I found that in both eyes the upper and lower lids were studded with granulations; there was an acute infection of the conjunctiva of the upper and lower lids and of the transition folds. This goes to show that the ordinary form of follicular conjunctivitis is really a granular conjunctivitis. I expressed two days later the upper and lower lids and used copper. The reaction resulting from this treatment was considerable, but with cold applications the reaction subsided and within a few days the child was well.

DR. H. KNAPP, of New York.—As this question of contagiousness and antisepsis has been brought up by Dr. Gruening, I want to say that I do not more than ordinarily cleanse the conjunctiva before the squeezing, but when the squeezing is over and after the bleeding has been going on for a time, which I encourage, I brush the whole cul-de-sac out carefully with a 1-5000 solution of bi-chloride of mercury. Even this I have often omitted without noticing any difference in the recovery.

With regard to the rationale; the action of the squeezing, I have given that subject considerable thought. It can scarcely be imagined that one squeezing removes all the germs that are in the conjunctival sac, which is often studded with granules from one end to the other, there being scarcely a square millimeter free. When the squeezing is thoroughly done, the granulations disappear as by enchantment, and; it seems, permanently. In a number of cases which I have followed for three or four months, there has been no return after the operation, and the conjunctiva was as white and smooth as an ordinary conjunctiva. I think the organism rids itself of bacteria by congestion, transudation and extravasation. I may be allowed to cite the old observation that a cataract operation that bleeds does not suppurate. Purulent sloughing of the cornea is arrested and the cornea clears up, when a perforation takes place,

and the oozing of aqueous, through it, drains and purifies the ulcer. In like manner, it seems to me, that, when this squeezing is done carefully, the bleeding and the oozing out of the tissue juice carry off the infective material which may still happen to remain. We must bear in mind that there is in the living tissue a sufficient force to destroy or at least render innocuous a number of germs. If larger colonies remain, I should not be surprised to see the disease reappear.

Paper by Dr. E. E. Holt, of Portland, Me.: "Extraction of Foreign Bodies from the Vitreous."

Paper by Dr. S. B. St. John, of Hartford, Conn.: "Extraction of Foreign Bodies from the Interior of the Eyeball."

DR. H. KNAPP.—I hesitate to open this discussion, because I know all the members present have had large experience with these matters and the remarks upon them might be prolonged indefinitely. I would beg, however, to make two remarks only.

Dr. St. John certainly did very well in this one case where he got the foreign body out of the iris. A few years ago I exhibited such a case at the Academy of Medicine. I made a curved corneal incision, exposed and removed the foreign body, reduced the iris, and the healing was perfect and complete without any interruption of any kind. I have had a similar case since. Foreign bodies in the iris can be removed by simply making a flat exsection, exposing the iris, picking up the foreign body and putting back the iris as in simple extraction of cataract.

With regard to Dr. Holt's case, I had such a case lately, in which a piece of steel had penetrated through the cornea and the periphery of the lens, and by search with the ophthalmoscope the body was seen sticking in the sclerotic about three millimetres below the macula lutea. It was surrounded by a white ring, evidently the cicatrizing edges of a rupture in the retina. I did not venture to go in with a magnet and make the attempt to draw this foreign body out. There was evidently a beginning of capsulation, and I thought it safer to allow the chip of iron to stay. I took the patient to the Hospital, kept him in bed two weeks, watching this process of capsulation by

which the foreign body was surrounded by a white substance of connective tissue. There was no inflammatory reaction, but some retinal congestion which gradually disappeared and the sight was very good.

DR. E. E. HOLT, of Portland, Me.—Dr. Knapp's case reminds me of one seen two or three years ago. The patient while hammering steel felt something strike his eye. His family physician could find no wound and the functions of the eye appeared to be normal. Several weeks after the accident the eye became painful and when seen he had suffered excruciating pain and the eye presented the appearance of a soft cataract. On removing the eye, a piece of steel the size of the point of a cambric needle was found near the macula lutea on the retina, surrounded by pus the size of a pea. I can't say that this foreign body had ever been encapsulated but certainly it would have been a good one to have left for it. So it can be said of Dr. Knapp's case as he said of those reported, "the last of it has not been told."

Paper by Dr. Lewis H. Taylor, of Wilkesbarre, Pa.: "Brain Tumor with High Grade of Choked Disc."

Paper by Dr. Albert G. Heyl, of Philadelphia: "Retinal Vessel Observation in Contusion of the Brain."

DR. R. J. MCKAY.—I was very much interested in Dr. Taylor's case, having seen a somewhat similar one some two years ago, having been called in consultation by one of our best physicians. This gentleman was a man of some prominence in the profession, he had translated Cazeaux's Midwifery, and you would suppose him to be a well equipped man. I was called in to see the patient, who was said to be suffering from trouble with the ear. I found she had a double optic neuritis with a good deal of esophoria and that she suffered excruciating pain. The attending physician regarded this as due to the ear trouble. We made a diagnosis of brain trouble. The pain was relieved by letting her have one eye covered for a long time, sometimes with a dark glass and sometimes with a patch. Subsequently a great variety of remedies were given to relieve her but in vain, until by cutting one of the interni

and then the other and then putting on weak prisms we finally succeeded. She lived some months afterward, and remained comfortable until within a few days of her death.

Paper by Dr. T. Y. Sutphen, of Newark, N. J.: "Amaurosis in Women; Clinical Cases."

Paper by Dr. G. E. de Schweinitz, of Philadelphia: "Additional Experiments to Determine the Lesion in Quinine Blindness."

DR. SAMUEL THEOBALD.—Were the experiments confined to dogs?

DR. DE SCHWEINITZ.—No. I have experimented to some extent with rabbits and cats. The latter are rather difficult to handle in physiological experiments. [Laughter.]

DR. HENRY D. NOYES.—I should like to inquire if Dr. de Schweinitz has turned his attention to nicotine and alcoholic poisoning?

DR. DE SCHWEINITZ.—I have had some experiments with tobacco, and some lead, but am not in a position to report now.

Paper by Dr. C. R. Oliver, of Philadelphia: "A Clinical Study of the Ocular Symptoms Found in the So-Called Mongolian Type of Idiocy."

Paper by Dr. Edward Jackson, of Philadelphia: "Eye-Strain from Correcting Cylindrical Lenses."

DR. H. KNAPP.—I would like to inquire of Dr. Jackson whether he means parallel or symmetrical axes? I have found that where asymmetrical axes were used there is difficulty.

DR. JACKSON.—With parallel axes the distortion would be in the same direction for both eyes. If they were symmetrically oblique, we would have one image elongated this way, the other that way. I have not observed any greater ease in getting the patient accustomed to obliquely placed lenses when placed symmetrically and those placed asymmetrically. I think that in the mass of cases they are not symmetrical.

DR. SAMUEL D. RISLEY, of Philadelphia.—My experience agrees with that expressed by Dr. Knapp. Where the axes

are inclined fifteen degrees top out for example, or fifteen degrees in, they get accustomed to it much more readily than if they were symmetrical. I am of that opinion always, for I constantly find that if you have the oblique axis of each cylinder turned at the top to the left, or turned at the top to the right so the lens stands this or that way, the patient is difficult to habituate to such glasses.

DR. HENRY D. NOYES.—One point which I think worthy of notice is this: that the examination of the ophthalmometer showing us, as it does, the axis of the cornea, is by no means the standard which we must invariably adopt in fitting the cylindrical glass. I have often seen eyes where the ophthalmoscope shows an axis pointing seventy-five degrees, but in which I have found I had to give the patient an axis at ninety. That happens constantly, and it emphasizes also the fact that the meridian of greatest divergence is not at right angles. That happens often. It means an irregular curve of the cornea, which we must compensate as best we can.

I am glad Dr. Jackson has brought this subject so well before our attention. This paper brings to my mind something like a satisfactory explanation of very difficult cases with which I have had to do in correcting astigmatism.

DR. EDWARD JACKSON, of Philadelphia.—Just one word. The placing of the axes parallel or nearly parallel will produce a much greater apparent change of shape, and I think it is of that the patient may complain for a long time. What I referred to were the symptoms of pain in the eyes and headache, those known as eye strain, not such a change of apparent shape.

Paper by Dr. Lewis H. Taylor, of Wilkesbarre, Pa.: "Insanity Following a Mydriatic."

DR. SUTPHEN.—I wish to refer to a case which I have under observation at the present time. It was necessary to enucleate one eye on account of sympathetic iritis in its fellow. To dilate the pupil in the eye with iritis I used sulphate of atropia in a solution of four grains to the ounce, every hour or two. Within twenty-four hours my patient became wildly delirious

and so violent that she had to be strapped to her bed. The delirium gradually subsided after a cessation of the use of the mydriatic. A second trial of the atropia a few days later was followed by a flushed face and signs of a nervous condition, which immediately disappeared after a small dose of morphine. The effect of the atropia, in this case, went far beyond the nervous irritability which we are all occasionally meeting with in its use.

DR. B. ALEXANDER RANDALL, of Philadelphia.—It may not be uninteresting since this case has been reported to speak of a slightly similar experience occurring in my practice, the trouble arising from the use of a single drop of hydro-bromate of hyoscine. I had used this solution on my own eyes without bad results, and in this particular case, which was that of a child coming to me from a distance, as I had no other mydriatic at hand, I put a single drop of 1% solution of hyoscine hydrobromate in each of the patient's eyes, and it was at least twenty-four hours before recovery from the delirium took place.

DR. MYLES STANDISH, of Boston.—I merely rise to say that I have had three cases of delirium in my practice following the use of a 1% solution of hyoscine.

Paper by Dr. S. D. Risley, of Philadelphia: "Note on Hyoscyamine.

DR. GEORGE C. HARLAN.—My attention has been called to a statement in the last edition of the "United States Dispensatory" that recent chemical and pharmacological experiments have shown that the hyoscyamine, duboisine and daturin as found at any rate in the shops are not only isomeric but are one and the same alkaloid, under different names.

Paper by Dr. Samuel Theobald, of Baltimore, Md.: "Supplementary Note to the Case of Useful Vision Maintained by the Aid of a Totally Dislocated Lens heretofore reported to the Society."

DR. HENRY D. NOYES.—I would like to ask Dr. Theobald a question for my personal information. We may all of us meet with congenital dislocation of the lens, and I have recently had

to deal with some cases of that kind during the past winter. They are sometimes accompanied with a very high degree of amblyopia so that the vision is extremely bad, and no one would even deem it right to interfere; but I have sought in vain for articles on the removal of lenses. Now they would not be removed if the lenses were not in a mobile condition. Is there any experience as to the propriety of removing these transparent lenses in these cases of congenital ectopia lentis. I would like to make this remark that in certain cases where glaucoma supervenes and iridectomy is not available for any reason whatever, I have found extreme benefit from a combination of cocaine and eserine, eight parts of eserine to one of cocaine, frequently accompanied by fomentations of hot water heated to 115° or 120° Fahrenheit, that this will reduce the tension of the eye, and when acting in combination with the other I find them very useful in some especial cases.

DR. R. J. MCKAY.—Dr. Theobald's case reminds me of a somewhat similar one occurring to me some eight or ten years ago in which I was called into consultation, and my experience may serve to answer a question which Dr. Noyes has asked. It was a case of congenital double dislocated lenses which were floating about in the vitreous and the patient was very highly amblyopic and myopic. She being very nervous and suffering considerable pain, I did not offer anything in the way of glasses or treatment at the first visit, and I saw the case no further after this until some time afterwards when I was sent for suddenly by the family doctor. I found her suffering severely with iritis and apparently panophthalmitis. She was very nervous and after I had prescribed for her I saw her no more. She went to Wills Eye Hospital, and was under the care of Dr. Keyser, whom I afterwards asked about the case, and he said that the patient's lenses had become dislocated and had got under the conjunctiva, and he had to remove one lens and one eye. Perhaps some of the gentlemen here may remember the case; she was at. 25 or 30, and this was some ten years ago.

DR. GEORGE C. HARLAN.—With regard to the removal of

dislocated lenses, I can recall one case which came under my observation some 15 years ago, that of a young girl, æt. 15 or 16 at the time. The lenses were totally dislocated, and were bobbing about in the vitreous. They were both transparent. She suffered from violent neuralgic pains, and under the impression that the lenses might be the cause of it, we concluded to remove them. I did so, with some difficulty, on account of their transparency. I was obliged to darken the room, and have an artificial light converged in the eye, and then I could see the lens only by the refraction at its margins. I removed them both by introducing the wire loop. I have seen this patient occasionally during the last few years. She still has good vision with cataract lenses. This case of Dr. Theobald's in which the patient continues to have fair vision through a dislocated lens, reminds me of one case, which was to me very interesting as an illustration of the Helmholtz Theory of Accommodation. The lens was separated completely from its connections, but was very little displaced from its normal position, and for five or six weeks remained transparent admitting of good myopic vision. The ophthalmoscopic examination was easily made; and the fundus was normal and presented no indications of myopic formation. The interesting point was that the degree of myopia caused by the liberation of the lens from its suspensory ligament corresponded exactly to the near point of the other eye, which was emmetropic.

DR. B. ALEXANDER RANDALL, of Philadelphia.—As an interesting case in connection with the case mentioned by Dr. Theobald, I might refer to the result of a ruptured globe with traumatic subluxation into the anterior chamber which I reported to this Society in 1886 where after the spontaneous reduction of the lens the patient had fair vision for quite a while through the clouding lens. This gradually became opaque, and he tried the bramblebush method, getting another blow upon the eye, which couched his lens neatly and he has now very good vision. $20/10$ with a cataract lens, which is as much as he can see with the uninjured eye.

DR. R. A. REEVE.—Some ten or fifteen years ago I had oc-

casion to enucleate the left eye of a young woman, who is now æt. about 30. She had congenital dislocation of the lens in the other eye. By wearing a cataract glass she now goes about with great facility, and in reading she bends her head forward in this way (indicating) with her glasses, and is able to read the finest text.

I have had quite a number of cases of congenital dislocation. One case was that of an accountant in one of our banking institutions, who did the exacting work required in that capacity satisfactorily. I adapted for his use two sets of convex lenses and he was able to do his work without interruption. However, I will not take up the time of the Society further in describing these cases.

The Society then, at 12:30 P. M., took a recess until 3:30 P. M.

AFTERNOON SESSION, THURSDAY, SEPTEMBER 24, 1891.

Paper by Dr. Samuel Theobald, of Baltimore, Md.: "Sub-normal Accommodative Power in Young Persons a Not Infrequent Cause of Asthenopia."

DR. R. J. MCKAY.—I have been very much interested in Dr. Theobald's paper, and I largely agree with his views about this trouble. I would like to state how I test in these cases. Before I use any prisms I find what the refraction is. I put a dark red glass in front of one eye and let the patient look at the gas light in the shape of a candle flame at twenty feet, and see whether there is diplopia hyperphoria, esophoria or exophoria, as the case may be; then I go on with prisms using ten degrees first, five on each side, bases in, and then I rotate these and find confirmation often of what I found with the red glass. Usually I make a mental note of that—I am able to carry things well in my mind—and then I examine the eyes with square prisms of the kind I first saw some twenty years ago in Dr. Noyes' office to find the muscular power that is present which I record; then I again put them through, looking at the light twenty feet off with the red light and with the prisms. I then know something about the strength of the

muscles, and record the "phoria," or "heterophoria" found. I rarely use a prism base down in exercising the muscles. By this procedure, I think I have gotten rid of the spasm, which Dr. Noyes mentions so pointedly, and feel I know something about the case. And if these patients have exophoria or esophoria in accommodation, I pay no attention to it, provided they have orthophoria for a distance, and fairly good muscular power. I think Dr. Theobald has brought out a good point, that when there is slight exophoria in reading power, and none at a distance, there may exist what he describes as subnormal accommodative power.

DR. EDWARD JACKSON, OF PHILADELPHIA.—I think Dr. Theobald has done well in calling attention to the swing of the pendulum in this class of cases. I do not think, however, that I can quite agree with him as to what he designates by the term subnormal accommodative power. It seems to me that if the amount of accommodative power is really up to the normal, if the eyes have the near point of normal eyes and exert the same amount of accommodation, to speak of them in this way will introduce confusion. It may be right to speak of subnormal accommodative endurance. The phenomenon, however, is very closely allied, almost identical, with that of insufficiency of the muscles. It is a faulty co-ordination of ciliary contraction, with contraction of the internal recti, if I understood the class of cases Dr. Theobald had chiefly in mind. Where with a certain amount of convergence there was a relatively small amount of ciliary contraction. These are closely allied to heterophorias rather than cases of simple weakness of the ciliary muscles. Now there are a very large number of cases, I think, that come to us with accommodative power actually below the normal. I find quite a large proportion of cases with decided eye strain, hyperopes, as well as myopes, presenting actually low power of accommodation. It seems to me these better deserve to be spoken of as cases of subnormal accommodative power than the other class to which, as I understood, Dr. Theobald principally referred.

DR. J. A. LIPPINCOTT, of Pittsburgh.—Dr. Theobald is

doubtless correct in stating that exophoria at the reading distance is very common; but I do not agree with him that any considerable degree of this condition ought to be regarded as normal. Most probably, 90% of my cases showing exophoria for the near point, amounting to six or eight degrees, derive positive comfort from the addition of a prismatic element to their reading glasses. The strength of the prism which I usually find of service is about one-half of the insufficiency for the reading distance.

In regard to the treatment of these cases of accommodative asthenopia there is one method that has not been alluded to, and that is the gymnastic method introduced by the late Dr. Dyer. The patient is directed to read for four or five minutes three times a day, and gradually to increase the time of each reading until an hour and a half is reached, namely four and a half hours of reading during the day. It is true very few men can be induced to carry out such a program, but many women can, and women it is, pre-eminently that suffer from this form of asthenopia. Dr. Dyer's method has been followed in hundreds of cases with excellent results, and I regard it as a most excellent contribution to ocular therapeutics.

DR. B. ALEXANDER RANDALL.—This abnormal accommodative power—or, better, insufficiency of accommodation—like insufficiency of the convergence—has always been especially interesting to me. It is largely a matter of terms; but I like better these latter names, for it strikes me as a bad phrase to call muscles insufficient which may be abundantly strong, yet do not act sufficiently. As I have stated on previous occasions, insufficiency of convergence for the near I have found rather the rule than the exception; but I cannot agree with Dr. Theobald in regarding it as normal, any more than I accept as normal the hypermetropia which is present in the majority of eyes. However great we may for the moment make the region of relative accommodation and convergence, these two functions are really closely linked, and deviation from the typical balance are usually cases of distorted co ordination. Some of these cases are best met by optically making up the

difference with lenses or prisms, and following Dr. Risley, I have always given about one-half of the correction for lateral deviations, as Dr. Lippincott advises; some are due to actual weakness, and are greatly helped by weak eserine collyria or administration of nux vomica; but in many cases efforts to mechanically restore the lacking balance are largely abortive, and relief is gained by tonics acting centrally in restoring the disturbed co-ordination.

DR. CRADLE, of Chicago.—The want of co-ordination of the convergence with the accommodation the speaker has referred to, I have met with very often by examining patients by the method described by me before the Society yesterday, by means of the apparatus which separates the field of one eye from the other without the use of prisms. One half of all persons I have ever seen examined show exophoria at a range of eleven inches, and it is very common to find from 3 to 6 degrees; yes, even 8 degrees, where no complaint exists, or where asthenopia is due to other causes. Moreover, I would state that exophoria at short range is necessarily a morbid occurrence. I would assert this definitely on the strength of the tests I have made with Landolt's ophthalmio-dynamometer, as persons who may show an insufficiency of convergence of 6 or 7 degrees at reading distance when binocular vision is suppressed, will still converge up to 2 inches without diplopia, in Landolt's test, and, therefore, have 20 metric angles at their disposal, an amount of convergence fully equal to the normal limit. Accommodative troubles which do not come under the classical heads, where we cannot distinctly assign a typical cause for the asthenopia, have been very common in my practice. Quite a fair number of these I have been unable to benefit by the use of prisms or spherical or cylindrical glasses or remedies as eserine intended to strengthen the ciliary muscles. I have for the past few years been able to relieve some of these, however, by attention to the nose, and it has been my good fortune in a fair number of instances to succeed in removing all asthenopia by means of an operation intended to relieve nasal obstruction. I must emphasize, how-

ever, that these remarks apply only to that class of asthenopia in which the complaints not due to typical errors of refraction or accommodation.

DR. JOHN GREEN, of St. Louis.—I have long felt that in dealing with asthenopic patients too little thought has been given to possible accommodative fatigue, and this whether in the presence or in the absence of noteworthy errors of refraction or of demonstrably disordered muscular balance. Some of the members present may recall a communication made by me to this Society in 1881, in which I adverted to the systemic use of very small instillations of a weak pilocarpine solution, in conjunction with graduated daily exercise of the accommodation as taught us by our late colleague, Dr. Ezra Dyer, in a paper printed in 1865 in the first number of our Transactions. I can now only reiterate what I stated here ten years ago, namely, that I regard my asthenopic cases as essentially cases of strained accommodation, and believe that I have derived great advantage in their treatment from the instillation, say twice a day, of a solution of hydrochlorate of pilocarpine of the strength of one or two grains to the ounce; the quantity to be instilled is carefully measured in the tip of a fine-pointed pipette, and should ordinarily not exceed perhaps one-tenth of a minim. The intention is to instill a quantity a little less than would be required to produce noticeable contraction of the pupil or tension of accommodation.

In this connection it may be permissible to refer to the fact that our colleague, Dr. N. B. St. John Roosa, has recently given expression to views substantially in agreement with those which I have long held.

DR. SAMUEL THEOBALD.—In regard to Dr. Jackson's objection to the use of the term sub-normal accommodative power, I would say that I gave the matter of nomenclature considerable thought. Two names occurred to me; one was the term used—sub-normal accommodative power, the other insufficiency of the ciliary muscles. I did not feel quite justified in using the latter term because I had no way of determining whether the weakness was in the ciliary muscles or whether

the condition of the lens was such as to make it difficult for the ciliary muscle to produce the usual change in its curvature. Therefore, I thought the former term was the better one to employ.

That there is an actual sub-normal accommodative power in these cases I feel convinced. This results either from weakness of the ciliary muscles or from some unusual condition of the lens.

As to Dr. Jackson's reference to insufficiency of the external recti muscles, I am a thorough believer in the fact that we have at times true insufficiency of the internal and external muscles. I think that the muscles are poorly developed in many cases, and that they are not capable of performing their work. I do not think there is simply a want of nervous energy. I have very often observed in making these tests, and I am sure that others have noticed the same thing, how greatly the size of a given muscle varies in different subjects. In one case we have twice as large a muscle as in another. In some cases there will be found merely a slender band, making us disposed to doubt whether we have cut the whole muscle through.

As to divergence in the near vision being anything like exceptional or being present, as Dr. Gradle has claimed, in only 50% of cases, I am very sure from my own experience that that percentage would not begin to represent the actual figures. I believe that nearly 90% of all the refraction cases I examine show exophoria at the reading distance. In emetropic eyes the normal condition in fully 90% of cases is exophoria at a reading distance, and this exophoria will vary; it will rarely be as low as 2 degrees and will go from that to 5 or even 6 degrees.

In regard to Dyerising or exercising the ciliary muscles by systematic practice, it seems to me that with a school girl who comes to me and who has been exercising her ciliary muscles in the most thorough manner it is very doubtful whether anything of this kind will be beneficial.

It is like telling a man who spends his days in breaking

stone on a road that he had better use dumb bells. He does not need local exercise. He is using his muscles every day. Certainly the cases I have seen were cases in which the muscles were habitually used; they were exercised daily. I doubt very much, then, whether any good could come from telling these patients to read systematically, and to gradually increase the length of time of reading.

Paper by Dr. George C. Harlan, of Philadelphia: "An additional Note on the Toric Lenses."

Paper by Mr. Henry S. Oppenheimer, of New York: "The Blind of New York City."

Paper by Dr. John Green and Dr. J. J. A. Ewing: "Colloid Tumor of the Optic Nerve."

Paper by F. F. Buller, of Montreal: "Glaucoma after Extraction of Cataract." (See October number of this Journal).

DR. B. ALEXANDER RANDALL.—I think this is a very important matter. I have seen no mention of these cases since those reported to the Society by Dr. Morris several years ago. I hope the paper will be discussed by the gentlemen present, because it is of very great importance. Having one or two cases of glaucoma where I am going to do cataract operations, I rather think I may have some trouble, and I would like very much to hear from the experience of members present.

At the close of Dr. Randall's remarks the reading of the minutes of the Society was proceeded with, following which at 5.40 P.M. the Society adjourned.

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